

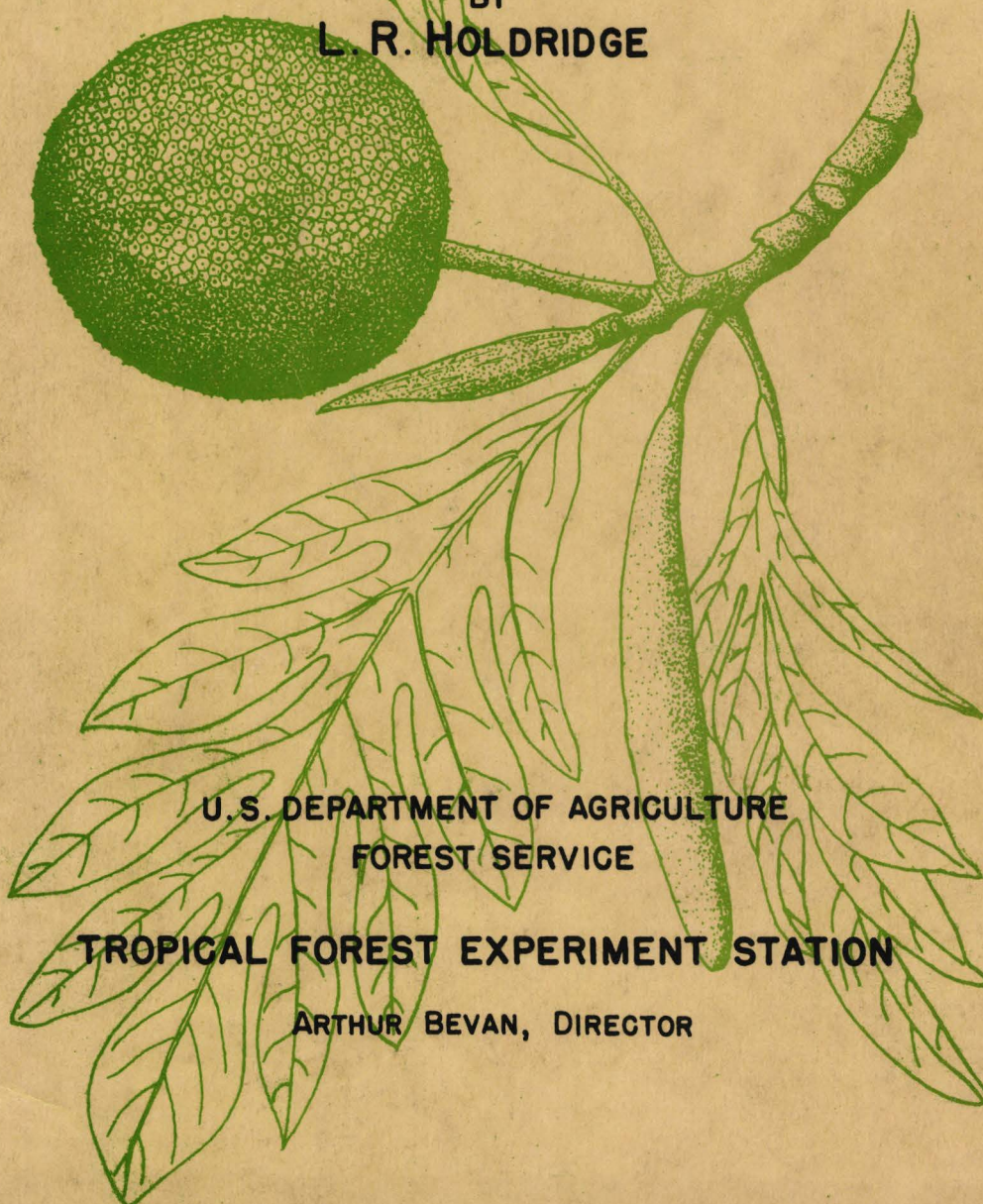
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Trees of Puerto Rico

VOLUME I
BY
L. R. HOLDRIDGE



U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

TROPICAL FOREST EXPERIMENT STATION

ARTHUR BEVAN, DIRECTOR

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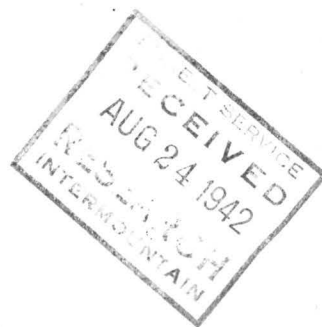
The illustrations face their respective descriptions.

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THE ANNUAL REPORT
OF THE
TROPICAL FOREST EXPERIMENT STATION
(For the year 1941)

NOT TO BE ISSUED

Due to the war no Annual Report for 1941 will be issued for general distribution. Eventually when a report is prepared the work of the Station for any year not previously reported will be reviewed.



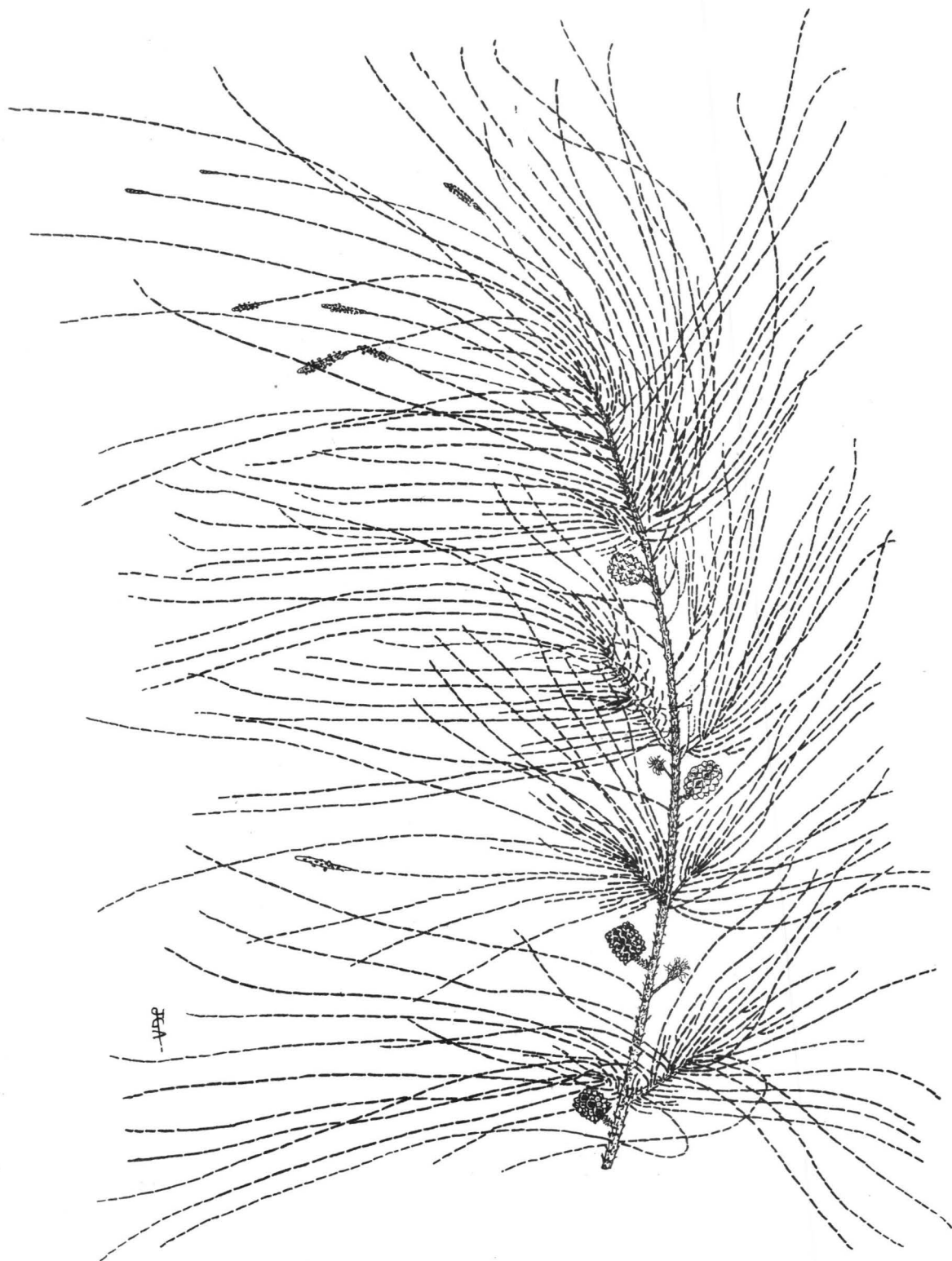
FOREWORD

Despite the many interesting and attractive native and introduced trees in the island of Puerto Rico, of which there are reported to be in the neighborhood of six hundred species, no reference work has been available that permits identification by those interested but not trained in technical botany.

The Tropical Forest Experiment Station some time ago started to assemble material for such a publication. Realizing that it will take a long time to complete such a task, it has been decided to publish the descriptions and drawings as they are completed in this preliminary form and thus make them available to the public. The first issue contains 50 species and will be followed by future volumes of similar size until the work is completed. Corrections, criticisms, and revisions are solicited so that ultimately the complete series can be edited and printed in one volume.

The illustration and description of each species have been so arranged that it is possible to compare them without turning a page. The order of the species and the nomenclature are taken from Britton and Wilson's "Botany of Porto Rico and the Virgin Islands". The common names presented come from the literature and from local usage. To make the descriptions best serve their purpose every effort was made to simplify them as much as possible. Technical terms were used only where they were vital to the accuracy of the description. A short glossary is included for the definition of these terms.

There has been no attempt to be strictly original and information of interest or of assistance in identifying the species has been drawn from all available sources. Acknowledgement is, therefore, made to all those who through previous publications and writings have helped to make this paper a possibility. A list of the chief references used is included at the end. In addition, many others have assisted by sending in specimens and providing local information. To the Caribbean National Forest and the Work Projects Administration who provided workers for making the drawings, and to the U. S. Army, Puerto Rican Department who made the multilith plates which made possible reproduction of the drawings grateful acknowledgement is made.



SEA

CASUARINACEAE

Casuarina equisetifolia Forst.

Casuarina, Pino, Australian pine, Beef-wood, She-oak.

This native of Australia, the Pacific Islands, and Southern Asia, grows well in Puerto Rico and has been widely planted since its introduction over 50 years ago. The tree is widely used for windbreaks, and is trimmed into hedges and other ornamental forms.

It is a rapidly growing evergreen tree, attaining a height of 40 meters and a diameter of 1 meter. The tall green-spined Casuarina swaying in the breeze, so reminiscent of northern conifers, is not a true pine. What appear to be needles are in reality the slender green twigs.

The function of leaves is performed by the drooping, jointed branchlets. The leaves are reduced to whorls of 6 to 8 minute scales at the nodes. Pieces of the jointed twigs are shed throughout the year and form a layer beneath the trees.

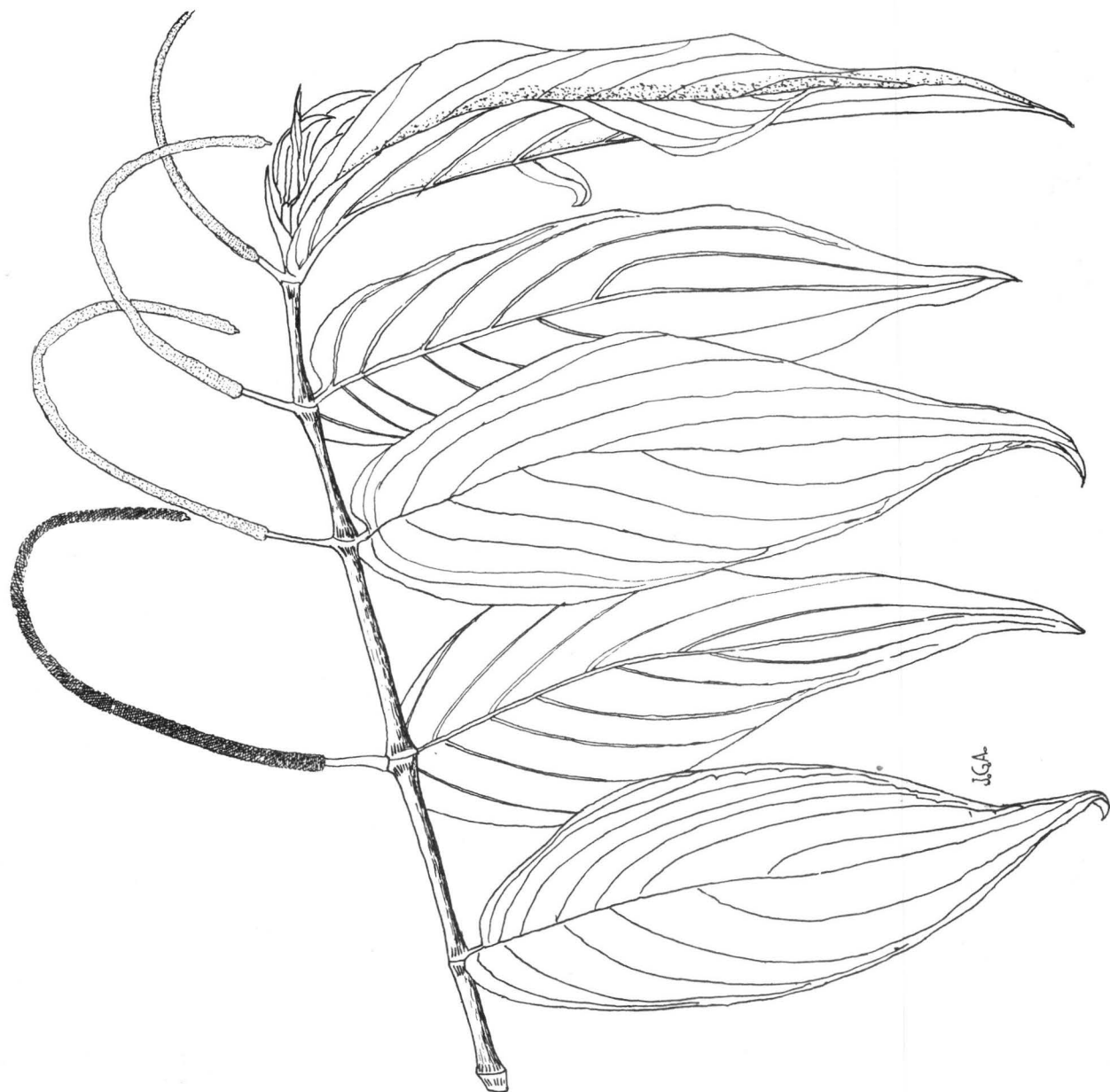
The male flowers are borne in small spikes at the tips of the branchlets. The female flowers develop into a woody cone about 2 cm. in length.

The light-brown winged seeds are very light, averaging 320,000 to a pound.

The wood is hard and heavy, but cracks and splits, and is not durable in the ground. It is used for ox-cart tongues, posts and beams not underground, and makes an excellent fuel or charcoal wood. The rough fibrous bark, exfoliating into longitudinal strips on older specimens, is sometimes used for tanning.

Natural seedlings are rarely found about the mother trees, but reproduction of the species in the nursery is not difficult, although some protection is necessary against the ants which carry away the seeds from the beds. This can be accomplished by poisoning the seeds, and the ant nests or by planting the seeds in raised flats protected from the ants. Fresh seed is preferable as germination drops off after the first two months. Although planted up to 3,000 feet above sea level, its optimum development occurs in the coastal plains. It grows well in sandy or brackish soil after once being established with good soil about the roots. Some specimens have been known to reach a height of 27 meters and a diameter of 2 dm. in 9 years.

PLATE - 2/3 natural size.



IGA-

PIPERACEAE

Piper aduncum L.

Higuillo

This species is found in Cuba, Jamaica, Hispaniola, the Windward Islands from St. Kitts to Trinidad, and in continental tropical America. Of the eight species of Piper in Puerto Rico, this one is the most common and attains the largest size. It is commonly found in brush pastures, on road banks, and in openings in the forests at lower and middle elevations.

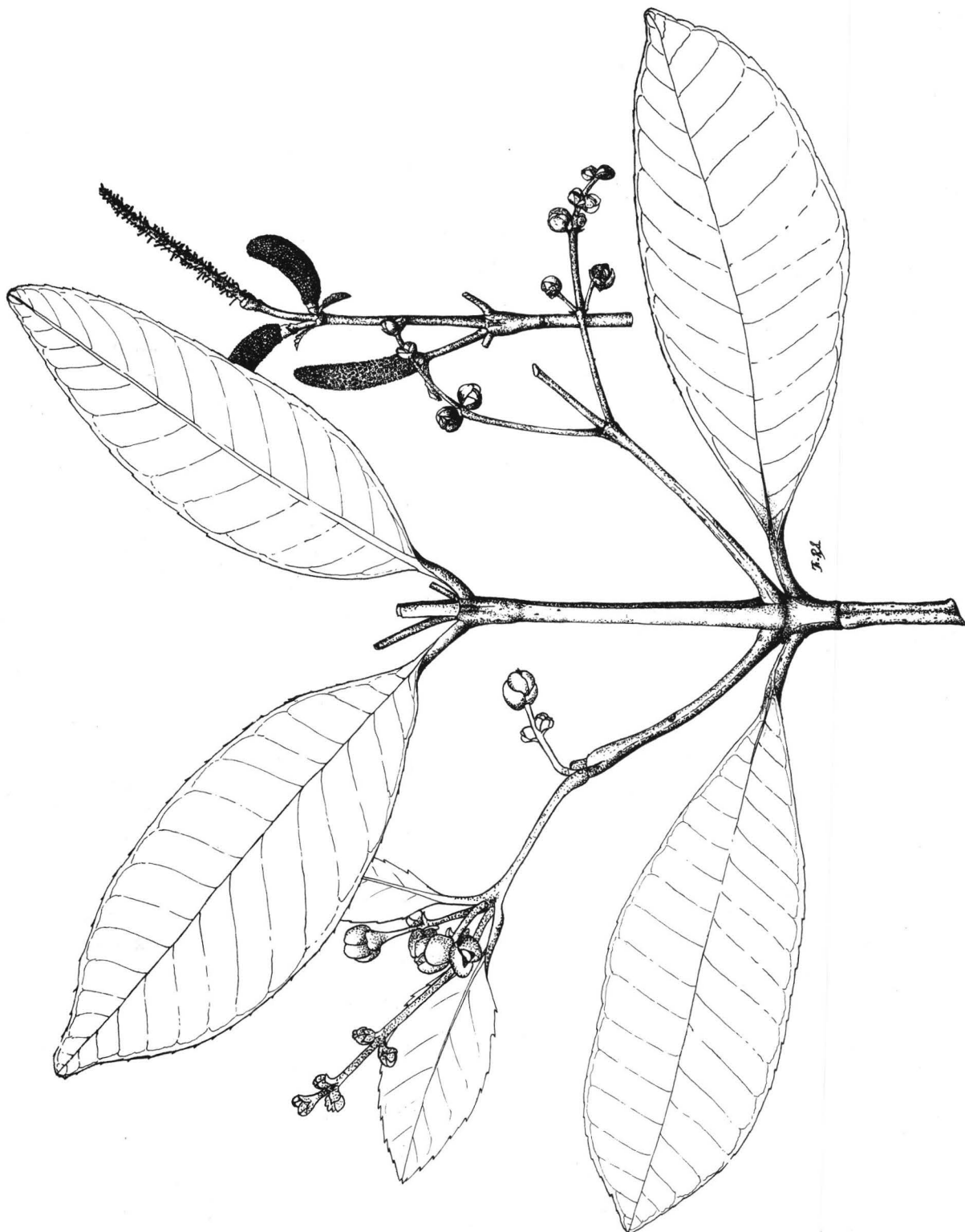
It is usually an upright shrub, but on favorable sites may reach a height of 10 meters and a diameter of 1 dm. The bark is smooth and greenish in color. The stem and branches are jointed, the smaller side branches commonly being shed at the nodes.

The leaves are papery, pellucid dotted as can be seen by holding them up to the light, oblong-elliptic to lanceolate, long acuminate at the apex, rounded and unequal at the base. They are 12 to 21 cm. long, and 3 to 8 cm. broad. They are pinnately veined, rough to the touch on the upper surface, and often more or less finely hairy beneath, especially so on the veins.

The flowers and fruits are borne in distinct spirals or rings on dense, curved spikes. These spikes are opposite to the leaves on the branches and are shorter than the leaves. The peduncles are finely hairy and several times longer than the leaf petioles.

The species is of little economic importance, only the larger stems being used occasionally in the framework of country houses.

PLATE - 3/4 natural size.



CHLORANTHACEAE

Hedyosmum arborescens Sw.

Azafrán

Azafrán is found in high mountain forests in the eastern part of Puerto Rico, and outside the island in Jamaica, and the Lesser Antilles from Guadeloupe to St. Vincent.

It is a glabrous upright shrub or small tree growing to 6 meters tall, with numerous, green-barked, pithy, brittle branches.

The leaves are simple, opposite, and somewhat fleshy. The leaf-blades are narrowly oblong-elliptic to elliptic, short tipped at the apex, acute at the base and toothed on the edges above the base. They are 4 to 18 cm. long and 2 to 5.5 cm. broad. The bases of the petioles are united by a stipular sheath.

Male and female flowers occur on separate trees. The former are borne in dense catkin-like spikes, from 1.5 to 2.4 cm. long; the latter occur in terminal or axillary panicles.

The fruit is drupe-like, enclosing a small three-angled seed about 2 mm. long.

No use is known for the tree. It acts like a weed, invading openings made in the forest. All parts of the plant give off a pleasant aromatic fragrance when crushed which gave rise to the generic name Hedyosmum from the Greek meaning aromatic odor. This odor serves as a ready means of identifying this tree in the forest.

PLATE - 3/4 natural size.



ULMACEAE

Celtis trinervia Lam.

Almez

This tree is found in Puerto Rico, the Virgin Islands, Mona, Hispaniola, Jamaica and Cuba. In Puerto Rico it is found in thickets and forests in the southern dry districts.

It is a slender tree, growing to 18 meters in height, or higher, with smooth gray bark. The slender branchlets are densely, fine-haired when young.

The leaves are ovate-lanceolate to ovate, long tipped at the apex, and at the base usually rounded on one side and acute on the other. They are 4 to 13 cm. long and 2 to 7.5 cm. wide. Their edges are toothed except at the base and on the long apex. They are glabrous or slightly pubescent and when old are often covered with minute black elevated dots. The petioles are pubescent and from 4 to 11 mm. long.

The small flowers are borne in clusters or singly in the axils of the leaves.

The fruit is a purple-black drupe 7 to 8 mm. long, about the same length as its slender stem. Each fruit contains a single roundish rough seed.

The tree is not common on the island and no special use has been noted.

PLATE - 2/3 natural size.



ULMACEAE

Trema Lamarckiana (R. & S.) Blume

Palo de cabrilla

This species occurs in Florida, Bermuda, Bahamas, Cuba, Jamaica, Hispaniola and from Saba to St. Vincent. In Puerto Rico it is fairly common in thickets and on hillsides and often springs up as a weed on road fills.

It is a small tree, growing to 10 meters in height, and sometimes to 3 dm. in diameter, or more often a shrub of 1.5 to 3.5 meters high, with slender, rough-pubescent twigs. The lower branches are horizontal, the branchlets lying in one plane. The bark is grayish and rough.

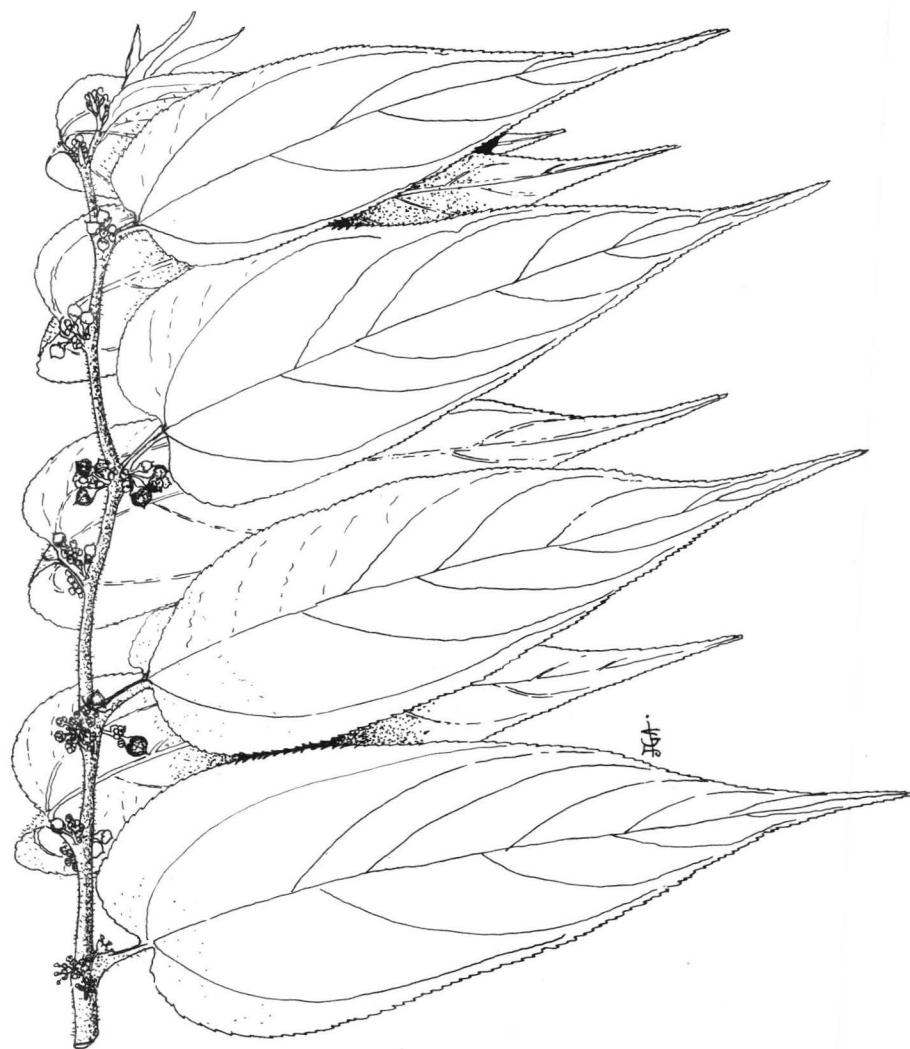
The leaves are small, oval-lanceolate, narrowed at both extremities, acute at the apex, and equilateral or inequilateral at the base. They are 2 to 6 cm. long, 0.6 to 2.5 cm. broad, and occasionally larger. They are very rough above, especially at the margins; reticulate-veined and finely tomentose beneath. The midrib and veins on the upper surface are sunken and very conspicuous below. The petioles are short.

The flowers are about 2 mm. in diameter. The staminate clusters are sessile; the pistillate, short-stalked. Flowering takes place in September and October.

The fruit is a glabrous, ovoid drupe, 2.8 to 3 mm. long.

No economic use is known for this species.

PLATE - 3/4 natural size.



ULMACEAE

Trema micrantha (L.) Blume

Palo de cabra, Guacimilla.

This tree is found throughout the West Indies from Cuba to Trinidad, and in continental tropical America. It occurs along the roads, on hillsides and in woodlands mostly at middle elevations in Puerto Rico.

It is a small or medium-sized, straight stemmed tree, sometimes attaining a height of 15 meters and a diameter of 4 dm. The twigs are slender and roughly pubescent. The bark is rough and slightly fissured.

The thin alternate leaves are oblong, long-pointed at the tip, toothed on the edges, and three-nerved and rounded, although often inequilateral and partly heart-shaped at the base; lanceolate, to lanceolate-ovate in shape. They are 6 to 15 cm. long, 2.5 to 5 cm. broad, and rough to the touch on both sides. The impression of sandpaper which rubbing the upper surface of the leaf gives, serves to readily distinguish this species from the smooth or soft upper surfaces of leaves of Celtis trinervia and Guazuma ulmifolia which somewhat resemble this tree.

The numerous, small, greenish yellow flowers are borne in the axils of the leaves in cymes equalling or about twice as long as the petioles of the leaves.

The fruits are small ovoid drupes, about 3 mm. long, surrounded by the persistent flower lobes, and turning red on maturity.

The light brown or whitish wood is weak and soft and is used here only for fuel and charcoal. The bark contains a strong fiber, but this is not employed on the island.

PLATE - 3/4 natural size.



MORACEAE

Ficus Sintenisii Warb.

Jaguey

This small leaved Jaguey is endemic or native to Puerto Rico only. It usually grows in mountain forests but has been found at lower elevations.

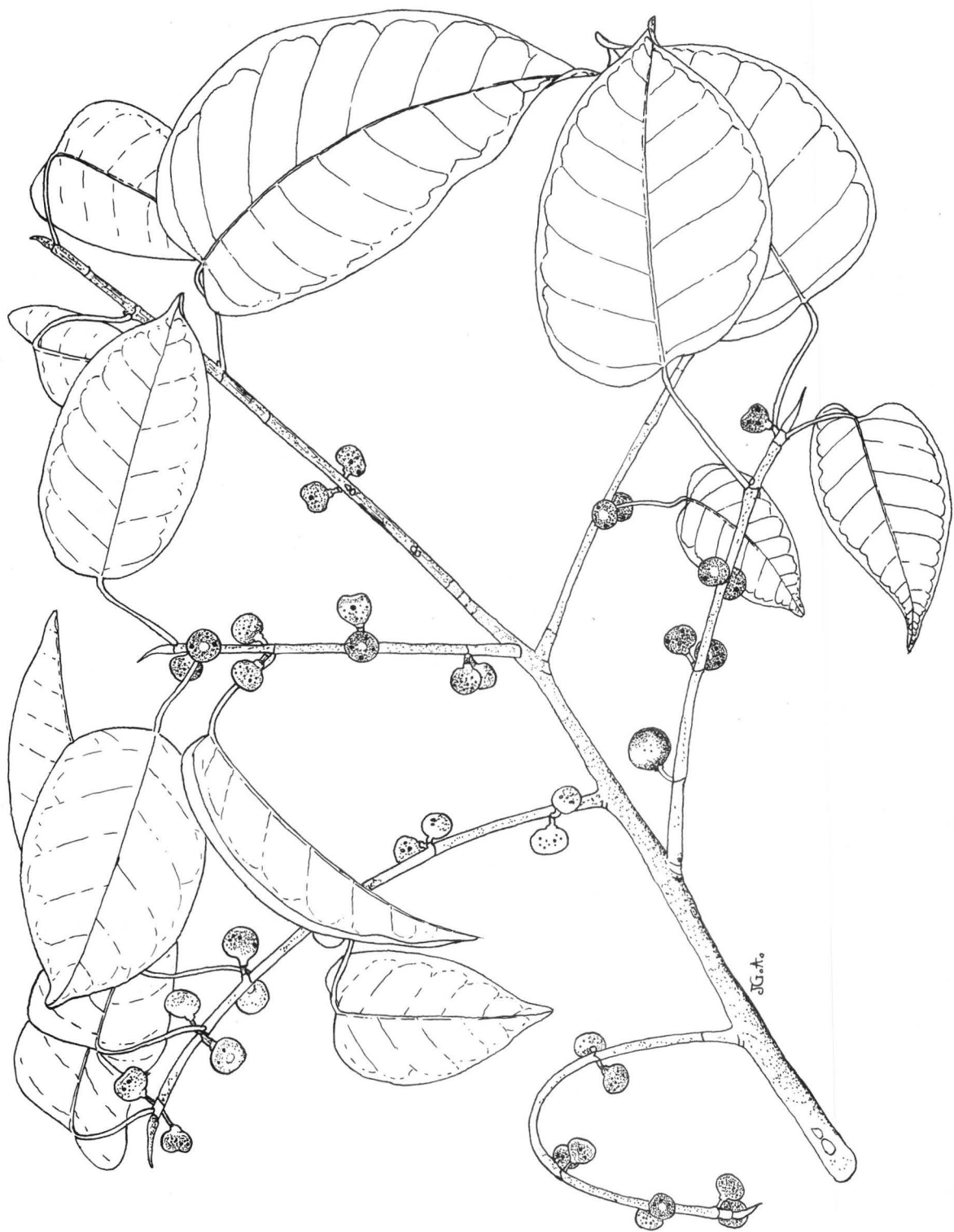
It may attain a height of 20 meters. The crown is spreading, the bark is smooth and gray, and its aerial roots are similar to those of F. laevegata. The leaves, bark and other parts of the tree exude a milky sap when cut or bruised.

The smooth, shiny leaves are alternate, simple and entire; elliptic to oval in shape or sometimes wider beyond the middle, tips short pointed, the base acute or rounded. They are from 3 to 7.5 cm. in length and from 1.5 to 4 cm. broad. The petioles are from 6 to 12 mm. in length. Striking characteristics are the numerous, parallel, rather prominent lateral veins, and the dull reddish color of newly emerged leaves. The venation and the small size of the leaves readily distinguish this species from any other native or imported Ficus on the island.

The nearly round receptacles, 4.5 to 6 mm. in diameter, are borne singly or in pairs in the axils of the leaves on slender stems 4 to 8 mm. long. The mouth or ostiolum at the tip of the fruit is prominent.

The wood, similar to the other jagueys, is soft, weak, and not durable. It is used only for firewood and charcoal.

PLATE - 3/4 natural size.



MORACEAE

Ficus laevigata Vahl

Jagüey, Wild fig.

This Jagüey is found in the islands of the West Indies from the Bahamas to Barbados as well as in southern Florida. It is rather common in the island along roads, in pastures, and in woodlands.

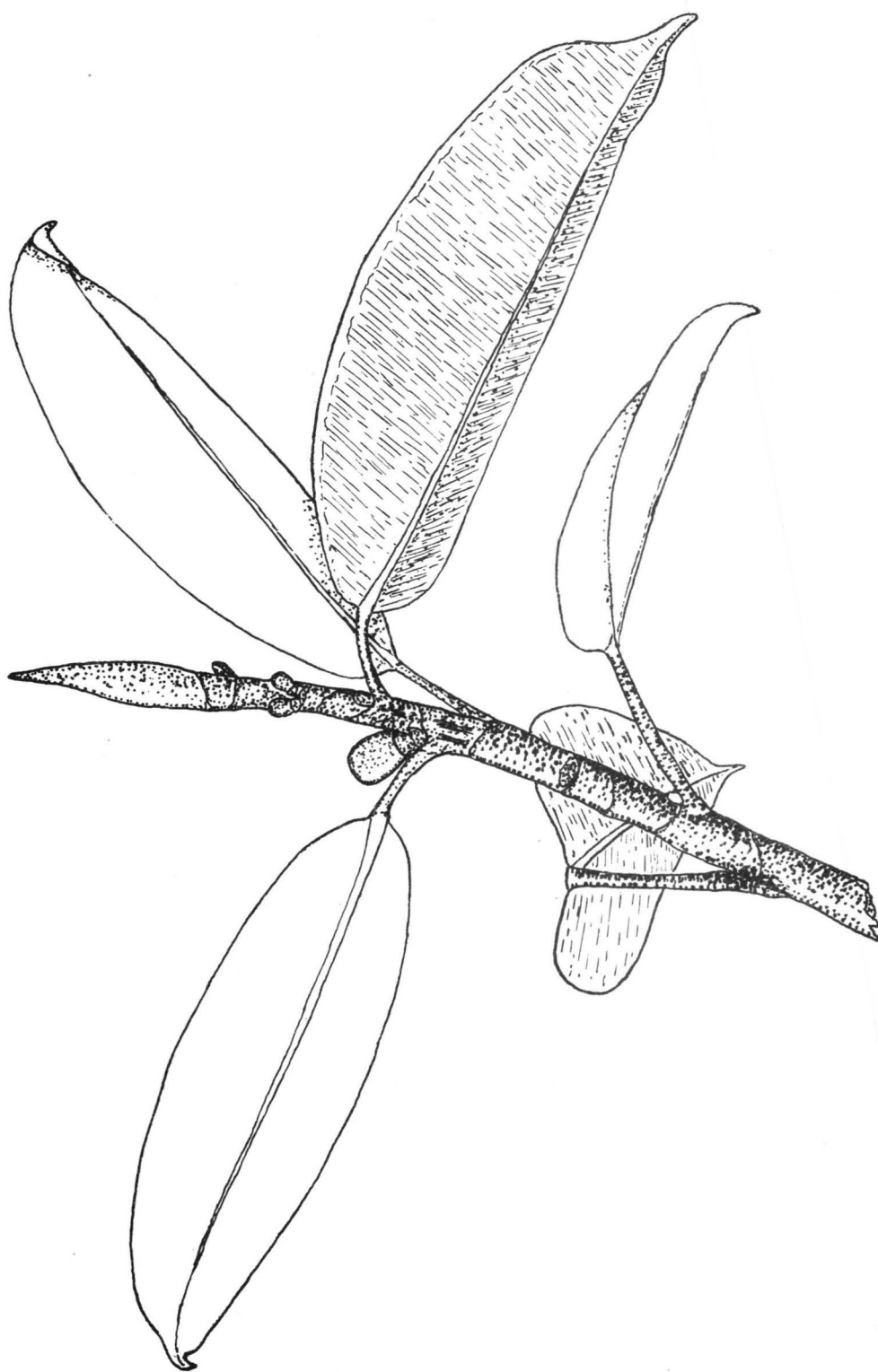
It is a medium-sized tree, growing to 20 meters in height, although on poor sites it may be shrub-like. The smooth bark is grayish in color and occasionally tinged with purple. A striking characteristic of the tree, as is common with species of Ficus, is the presence of aerial roots hanging from the trunk or branches. All parts of the tree exude a milky juice when cut or broken.

The leaves are alternate and variable in size and shape. They range from 3 to 17 cm. in length and 2 to 9 cm. in width. They are oval, ovate, elliptic, or oblong, blunt or acute at the tip, and rounded, obtuse, or partly heart-shaped at the base, smooth, and entire. The petioles are from 1.5 to 4 cm. in length.

The flowers are borne on the inner walls of globose or nearly globose receptacles, 7 to 10 mm. in diameter, which occur usually in pairs in the axils of the leaves. At the tip of the receptacle is found the more or less prominent mouth or ostium which is closed by imbricated bracts. If the receptacle is broken open, the numerous small flowers or fruits, are found, a peculiar arrangement which is typical of species of Ficus.

The wood of this tree is soft, weak, non-durable, and of little or no use except for firewood or charcoal.

PLATE - 2/3 natural size.



MORACEAE

Ficus elastica Roxb.

Palo de goma, India rubber
fig, Assam rubber.

Although commonly grown in northern climes as a potted house plant, this native of southern Asia is a very large, spreading, ever-green tree planted occasionally in the island for ornament or shade.

On good sites it may reach a height of over 30 meters with a large fluted trunk often buttressed at the base. Numerous stout, aerial roots hang down from the huge side branches.

The dark-green, shiny leaves form a dense crown. They are leathery and elliptical in shape, with a prominent midrib. They are from 12 to 24 cm. long, and are enclosed in the bud in terminal red stipular sheaths which fall as the leaves expand. The leaves of young shoots are much larger than others.

The small ovoid fruits, sessile in pairs at the nodes, are greenish yellow to red when ripe, about 1 cm. long, and contain numerous small seeds. They are eaten by birds and sometimes by children.

This species produced the India rubber of commerce, the earliest source of rubber known. In India, trees were tapped in the natural forest and extensive plantations were established for the commercial production of the latex, but when Pará rubber was found to come into bearing much sooner and to produce higher yields per acre, this species was entirely discarded by Eastern planters in favor of Hevea brasiliensis.

In its natural habitat, seeds carried by birds germinate in the summits of tall trees, derive their nourishment from debris in forks and hollows of the supporting tree and send down aerial roots to the ground. Once vigorously established it chokes out the supporting tree. Artificial propagation is by seeds, cuttings, or layers. Growth of the tree is rapid. The terrestrial roots are superficial and often form a dense net-work along the surface of the ground.

PLATE - 1/2 natural size.



MORACEAE

Ficus nitida Thunb.

Laurel de la India.

This native of the East Indies is planted in Puerto Rico and other tropical countries for ornament and shade. There are some excellent specimens of this tree in and around San Juan and a few throughout the island such as the beautiful trees on the Guayama plaza.

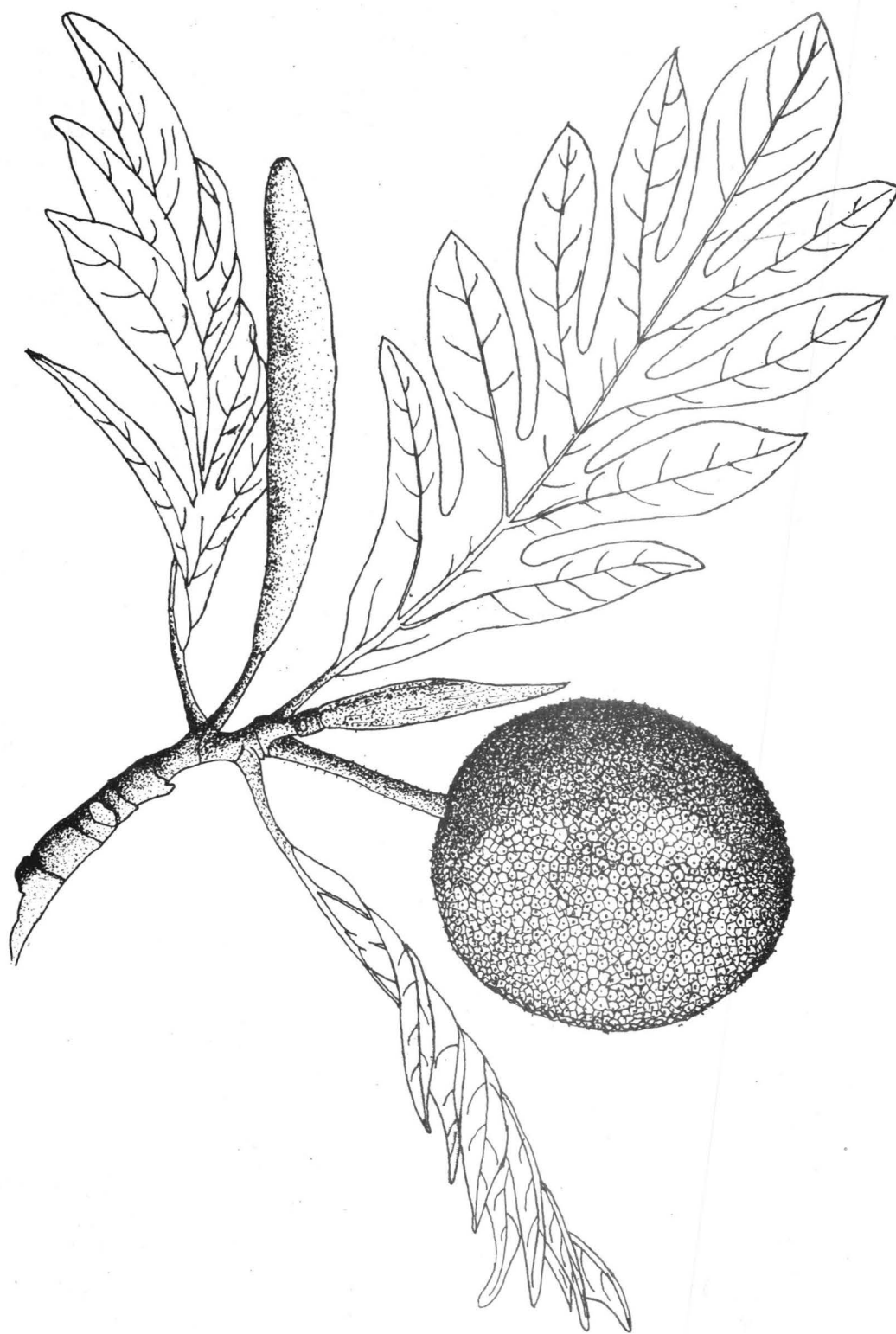
It is a large, evergreen tree, growing to 20 or 30 meters in height or sometimes spreading out, assuming the banyan-like habit of Ficus benjamina. The bark is smooth and gray and numerous clusters of aerial roots develop on the side branches and trunks. The whole crown of the tree is densely leafy, making this an excellent species for shade.

The dark green leaves, borne alternately on the rather slender twigs, are glabrous, elliptic, and acute at both ends. They are 5 to 7 cm. long, glabrous, and leathery.

The small globose fruits are about 7 mm. in diameter; sessile and borne in pairs in the axils of the leaves.

This species would undoubtedly be much more commonly planted if propagation were less difficult. Propagation by cuttings is not a certain method, although good results have sometimes been secured in this manner. Marcottage or Gootee-layering gives much better results and has the advantage that a fairly large branch can be used. After a tree is established, its growth is rapid and its beauty is adequate compensation for the trouble of propagation.

PLATE - 2/3 natural size.



MORACEAE

Artocarpus communis Forst

Pana, Panapén, Palo de pan,
Breadfruit

The breadfruit, native to the Pacific Islands but now scattered throughout the tropics, is one of the most beautiful of tropical trees. It is of interest that the first cargo of breadfruit plants taken from Tahiti in 1787 for the West Indies was on board the ship "Bounty" when the famous mutiny against Captain Bligh took place. The tree was brought to the West Indies on the request of plantation owners to provide cheap food for the slaves.

The tree is a rapid grower, and attains 20 meters in height and 6 dm. or more in diameter. The bark is gray, and smooth. An abundant milky sap exudes when it is cut or bruised.

The shiny, dark green leaves are deeply lobed above the entire, wedge-shaped base, 3 to 9 dm. long, from 2.8 to 4.5 dm. wide. Long foliar stipules protect the young leaves before their emergence. In some sections of the island, the leaves are cut to provide fodder for cattle during extended periods of drought.

The same individual bears two kinds of flowers. The male flowers are club-like spikes 2.5 to 4 dm. long, from which a pleasant tasting dessert is sometimes made. The female flower clusters are almost spherical, consisting of thousands of individual flowers.

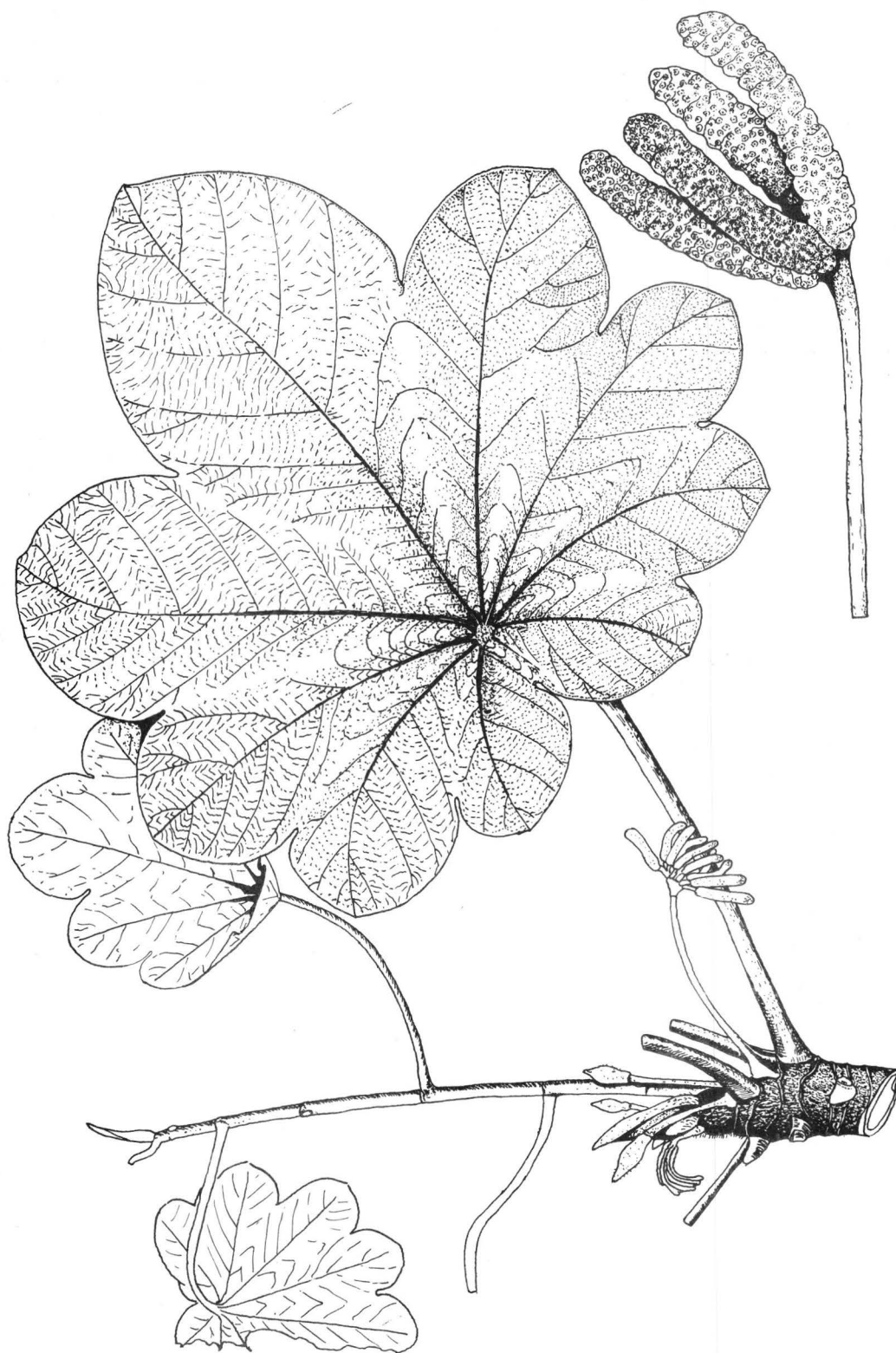
The multiple fruit which develops from the latter is pea-green in color, subglobose or oval, 1 to 2 dm. in length, and is produced in two's or three's at the ends of the branches. The fruit is eaten before complete maturity, cooked as a vegetable. The seedless variety, the one illustrated, is considered the better for eating.

The strong yellowish wood is used for furniture and in construction. The Hawaiian natives made surf boards of the wood because of its lightness. The milky sap is very sticky and is used in some countries to catch birds as well as in the manufacture of boots.

The tree is propagated by root cuttings, layering, or by seed in the seeded variety.

Another form, called "pana de pepita", can readily be distinguished by the fact that the leaf is much less deeply lobed, and the fruit is covered with greenish, spiny protuberances. The flesh of the fruit is employed like the other as a vegetable and contains several large, brown seeds similar to European chestnuts, which are eaten following boiling or roasting.

PLATE - 1/3 natural size.



MORACEAE

Cecropia peltata L.

Yagrumo hembra, Yagrumo,
Grayumo, Trumpet-tree

The yagrumo hembra is widely distributed in the West Indies and is found in continental tropical America. It is very common in humid regions especially on cut-over areas, and occurs at both low and high elevations.

It is a medium-sized, deciduous tree, attaining 20 meters in height. The tree is often stilt-rooted. The stem, which yields a copious milk, is hollow and divided into chambers by transverse partitions. The branches are few and thick, and the grayish bark is smooth with raised annular ridges.

The alternate, simple leaves are palmately lobed and very conspicuous because of their large size and the whitish under surface. They are 3 to 4 dm. broad, dark green and rough above. The stout petioles are 3 dm. or more long. When there is a breeze, trees on a distant hillside appear to be covered with a mass of white flowers because of the sharp contrast between the upper and lower surfaces of the leaves. This characteristic is responsible for the name "yagrumo", which is used on the island to indicate a "two-faced" person.

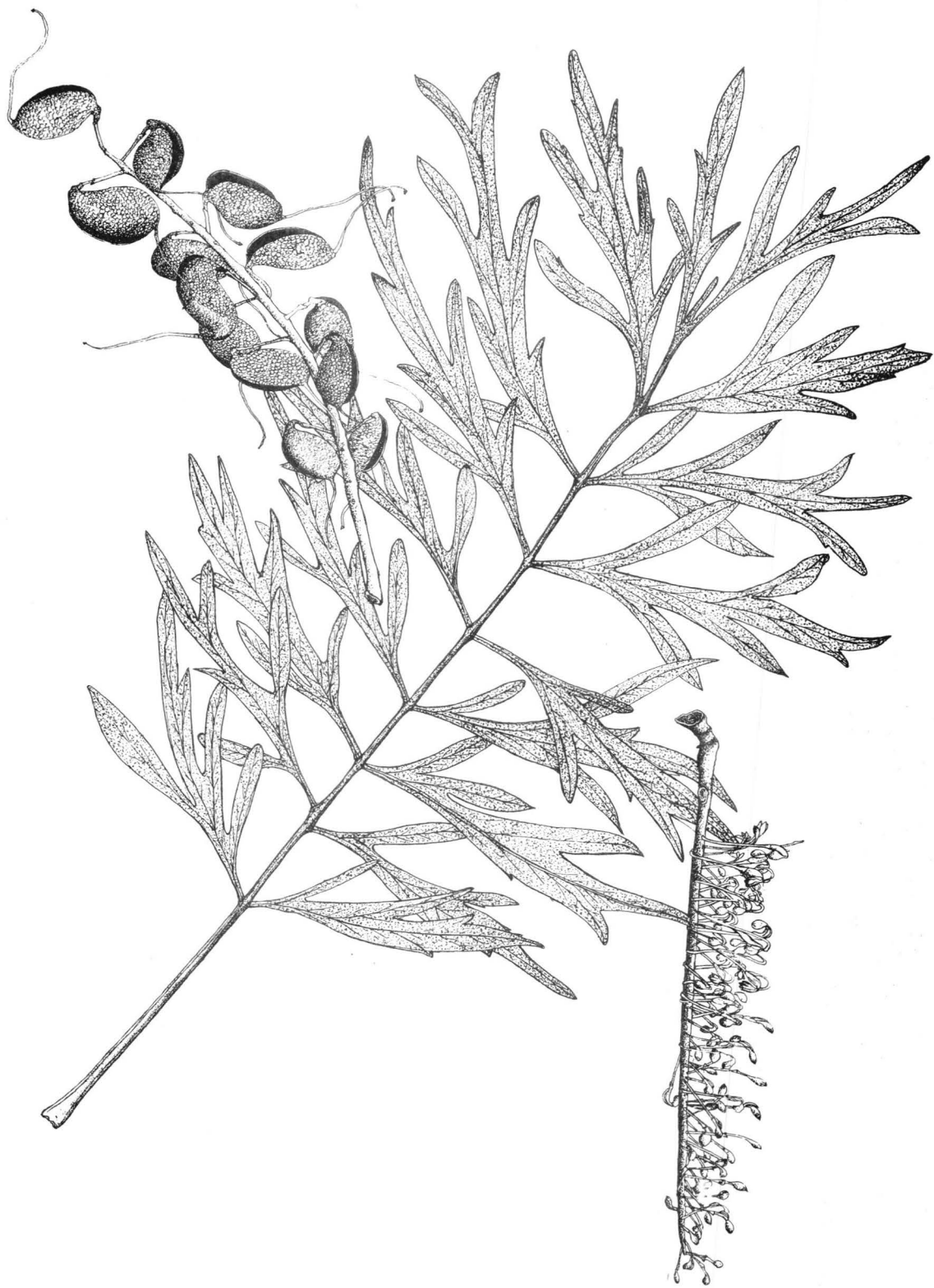
The flowers occur in dense yellowish spikes. The male spikes are numerous in the clusters, the female being thicker and only 2 to 6 in a group.

The fruits which are 10 to 12 cm. long, and 1 to 2 cm. thick, are smoky green in color with numerous black dots. It is reported in Trinidad that these are greedily eaten by bats.

The wood is soft and nearly white and has little utility although it is used in some countries for rafts and occasionally for fuel or charcoal. The inner bark supplies a useful fiber and the latex has some use in native medicines.

The hollow stems are sometimes used as water pipes and while on the tree, the interiors of the branches furnish homes for certain species of ants and small bees which gain access to the hollows through a thin spot in the stem found above each joint. As payment for the residence furnished them, they are quite aggressive in driving away insects or other natural enemies which threaten the tree.

PLATE - staminate spike, natural size; foliage, x 1/3



PROTEACEAE

Grevillea robusta A. Cunn.

Roble de seda, Roble de plata,
Silk oak.

This tree is native to Australia, but has been widely distributed through tropical countries. Scattered individuals or rows of trees of this species are found along roads and fence rows in all sections of Puerto Rico where it is planted for shade or ornament.

It is a medium sized or large tree, growing to 30 meters in height and 9 dm. in diameter. The trunk is usually very straight, and the bark is gray.

The bipinnate leaves are deeply divided into narrow segments, much after the fashion of fern fronds. Their under surface is silky and silvery white. They are approximately 3 dm. long.

The large racemes of orange-colored flowers, are borne in profusion and render the tree very showy and attractive.

The fruit is a somewhat leathery, recurved follicle, oblique in shape, tipped by the slender persistent style. Each fruit contains one winged seed.

The wood is light in color and very attractively marked, somewhat like oak. In its native home it is generally used for cabinet making, paneling and other interior work.

It is propagated by seed and can be grown in any section of the island as it is not very exacting as to site requirements. However, it should be planted with caution on the island since most specimens are heavily attacked by scale insects.

PLATE - 2/3 natural size.



POLYGONACEAE

Coccolobis uvifera (L.) Jacq.

Uva de mar, Uva de playa,
Sea grape.

The Sea grape is commonly found in coastal thickets in Southern Florida, the West Indies, and in continental tropical America.

It varies in form from a low prostrate shrub on wind-swept beaches to a large tree, up to 15 meters in height and attaining 1 meter in diameter. The bark is smooth, grayish brown in color, with large irregular pale blotches. The twigs are stout and finely pubescent when young, but soon become glabrous.

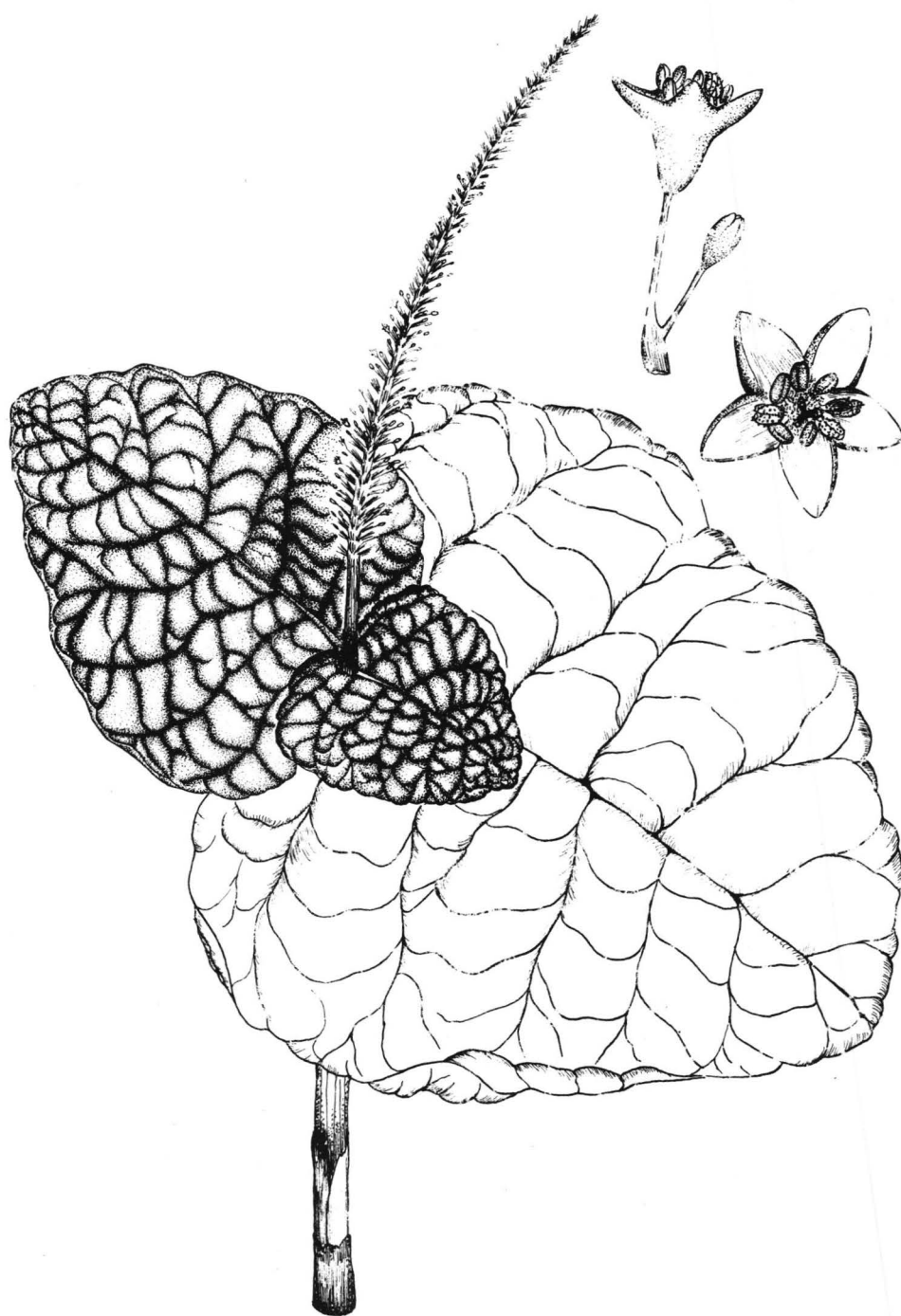
The thick leathery leaves are round or broader than long, and heart-shaped at the base. They are 7 to 20 cm. wide. New leaves are reddish, as are the midribs and veins of older leaves. The stipules consist of long ocreae which completely encircle the twigs above the alternate leaves. After persisting on the branches for two or three years, the leaves turn red or scarlet before dropping. Oviedo wrote that early Spanish colonists used the smooth leaves as a substitute for letter paper, impressing characters on the surface with a pin.

The small greenish-yellow flowers are found throughout the year, borne in terminal or axillary racemes, 1.5 to 3.5 dm. long. They are very fragrant.

The nearly globose, greenish to purplish fruits hang in drooping clusters resembling bunches of grapes; the thin layer of astringent, juicy pulp edible and the fruits are occasionally sold on the streets wrapped in cone-like packets, formed by rolling individual leaves and fastening their edges with small twigs. It makes a delicious jelly and has been used in the West Indies in the preparation of an alcoholic drink.

The sapwood is thick and light colored, the heartwood is heavy, hard, and dark brown in color. It is fairly easy to work, takes a high polish, is strong and durable, and finds use in general construction, furniture making, and cart construction. The bark yields a red, astringent liquid from which is extracted the "West Indian kino" or "gum kino" of commerce.

PLATE - 2/3 natural size.



POLYGONACEAE

Coccolobis rugosa Desf.

Ortegón

This tree is reported only from Puerto Rico and St. Thomas. It is found locally in wet or moist woodlands. The two largest known areas where this tree is growing are in Barrio Maizales, above Naguabo in the Luquillo Mountains and in the patch of woods on the west shore of the San José lagoon in Santurce.

Once seen, this tree is never forgotten as it possesses a set of odd and striking characteristics. Individuals are very slender, growing to 15 meters high with a trunk less than 10 cm. in diameter and usually without any side branches. The stout young growth is ridged and the bark of the trunk is light gray and fissured.

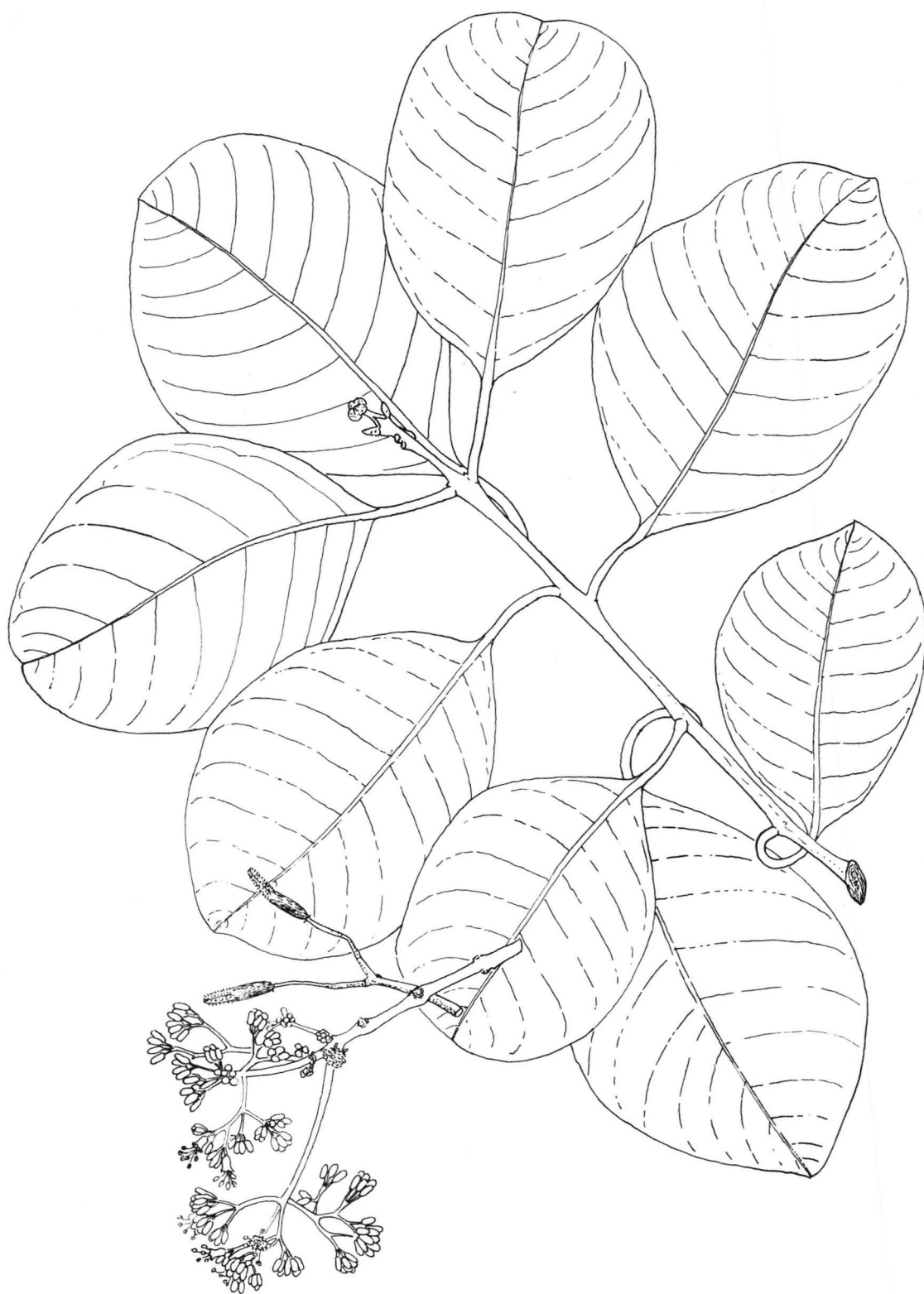
Clasping the stem alternately along its whole length or on the upper part are the immense nearly orbicular leaves which are 3 to 6 dm. broad; completely glabrous, strongly veined, wrinkled, very thick, and brittle. The ocreae or clasping stipules characteristic of all species of Coccolobis are very large on this tree. Because of the rigidity and durability of the leaves, many rooms in houses on the island in former times contained as decoration a portion of the stem with its large leaves brilliant with gilt or silver paint.

Striking as the tree is at all other times it is still more noticeable in flower when the long slender stem is topped by a bright red or crimson spikelike raceme from 3 to 6 dm. long. The flowers are numerous but small.

The ovoid to nearly round orange red fruits are about 6 mm. long.

No use other than for ornamentation is known.

PLATE - Branch x 1/8; individual flowers x 4/3



NYCTAGINACEAE

Pisonia albida (Heimerl) Britton

Palo bobo, Corcho

This tree is found only in Puerto Rico and on the adjacent small islands of Mona and Caja de Muertos. It is fairly common on limestone hills and near the coast in dry sections.

It is a spreading, deciduous tree, growing to 12 meters in height and 6 dm. in diameter, with finely-hairy twigs. The bark is smooth and light gray in color.

The entire, mostly opposite leaves are oblong to elliptic or oval in shape, rounded or blunt-pointed at the apex, and rounded or acute at the base. They are 4.5 to 12 cm. long and 2.5 to 7.5 cm. broad (often much larger on young shoots), smooth and grayish green above, and of a paler color and finely hairy below. The petioles are from 1 to 3 cm. in length.

The male and female flowers are borne separately on the same tree. Both kinds are rather inconspicuous and have no petals. The sepals of the male flowers are about 2 or 3 mm. in length, the stamens usually 8. The female flowers are borne in clusters which branch in pairs.

The club-shaped fruits, 6 to 7 mm. long, are 5-angled, each angle bearing a row of glands above the middle.

The wood of this species is light and soft and has little use except for fuel.

PLATE - 2/3 natural size.



MAGNOLIACEAE

Magnolia splendens Urban

Laurel sabino

This tree is native only to the eastern mountains of Puerto Rico and at present is largely restricted to lands of the Caribbean National Forest in the Luquillo Mountains.

It is a large evergreen tree, growing to 30 meters in height and 1-1/2 meters in diameter. The branches are stout, greenish when young, and sometimes covered with fine hairs. The ringed stipular scars on the twigs are very distinctive. The bark is smooth on young trees, becoming roughened with age. Suckers or new shoots are produced abundantly on the trunk.

The olive green leaves are shiny and leathery, ovate to ovate-elliptic in shape, 10 to 18 cm. long, and 5 to 9 cm. broad. New leaves are densely covered beneath with flat-lying, silvery-brown hairs which feel velvety to the touch.

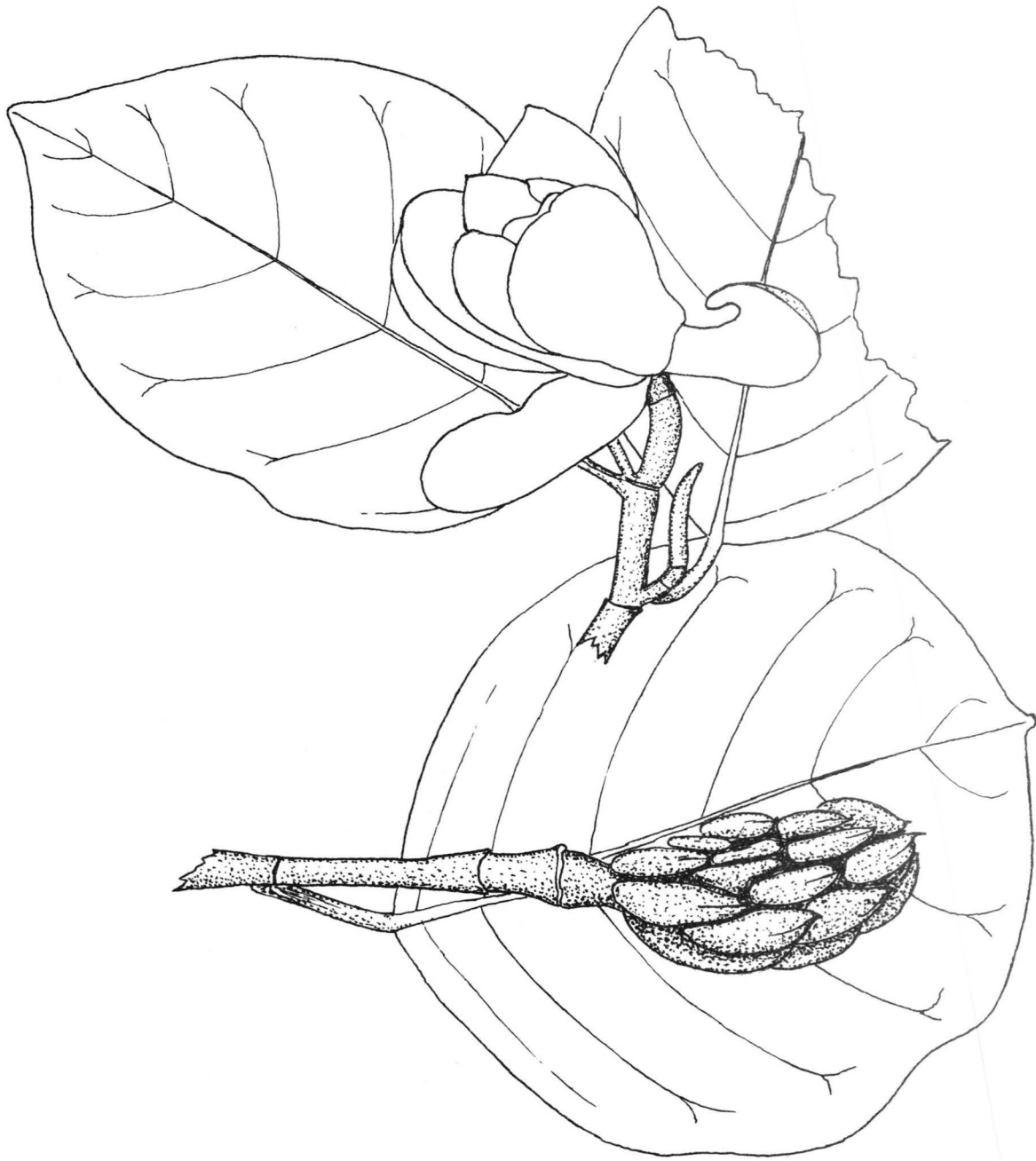
The beautiful white flowers are somewhat smaller than those of M. portoricensis but give off the same fragrant spicy aroma.

The fruit is cone-like, 3 to 3.5 cm. long and 3 cm. thick, containing several triangular, red, fleshy seeds. Apparently most seeds are sterile, as germination is rare both in nurseries and in the natural forest, and microscopic examination of sections of many seeds has disclosed formation of an embryo in only a few instances.

The greenish-brown wood is heavy, strong, easy to work and durable. Local demand is greater than the supply, as the timber is valued for furniture and construction work.

Attempts to propagate the species by cuttings have been unsuccessful to date; however, the tree coppices well and thus is not in danger of immediate extermination.

PLATE - 2/3 natural size.



MAGNOLIACEAE

Magnolia portoricensis Bello

Jaguilla, Mauricio, Alciba,
Burro, Ortegón

The jaguilla is found only in Puerto Rico, occurring in mountain forests from a short distance west of Caguas to Maricao, and found mostly between elevations of from 500 to 1200 meters above sea level.

It is a large, evergreen forest tree attaining a height of 20 meters and a diameter of 1 meter. The branches are thick, usually green near the tips and glabrous. The bark is smooth on young trees, becoming somewhat roughened in age.

The leaves are dark green, shiny, leathery, broadly oval or somewhat obovate, short-pointed at the apex and rounded at the base. They are 5.5 cm. to 10.5 cm. long, and smooth on both surfaces. The petioles about 2 cm. long. New leaves are enclosed in long, green stipules, which on falling, leave ring scars completely encircling the twigs.

The large, white flowers appear on the ends of the branchlets, with greenish sepals similar to the petals, which are ovate and about 6 cm. in length. The flowers give off a pleasant aromatic fragrance.

The fruit is cone-like, usually lop-sided, from 3 to 5 cm. long. The carpels split open on maturity to release the red, triangular seeds which for a while hang to the cone by fine threads.

The wood is olive-brown or yellowish green in color, straight-grained, fine-textured, strong, and very durable. It possesses the same spicy fragrance as the other parts of the tree. It is in high demand locally for furniture, cabinet work and other uses. There is no perceptible difference in the appearance or qualities of the wood of this species and M. splendens. They are both sold under the name "laurel sabino."

Because of its value, it has been heavily cut and relatively few trees remain. Attempts to germinate the seed for reforestation have not succeeded.

PLATE - natural size.



ANONACEAE

Cananga Blainii (Griseb.) Britton

Haya minga

This tree is found in Cuba, Hispaniola, and Puerto Rico. In Puerto Rico it is found at higher elevations mostly between 500 and 1000 meters above sea-level in the central and western mountains.

It is a medium-sized or large tree, growing to 25 meters tall and 1 meter in diameter. It is conspicuous because of the very dark, purplish black color of the smooth bark, and the zig-zagging of the young twigs between the leaves. The trunk is usually irregular, in cross-section much thicker in one direction than the other.

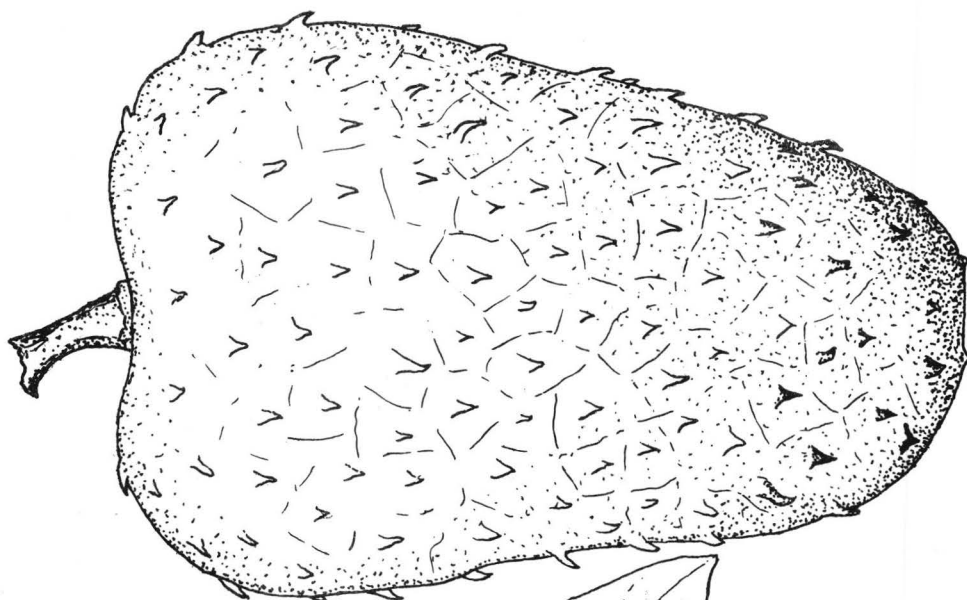
The leathery leaves are alternate, simple, and elliptic or sometimes wider beyond the middle, rounded or acute at the apex, and acute at the base. They are 4 to 8 cm. long and 2 to 3 cm. broad, glabrous, and entire.

The greenish yellow flowers are borne singly in the axils of the leaves. The six petals are rather leathery, 10 to 14 mm. long, bluntly pointed and covered with fine hairs.

Since the several carpels are distinct, the fruit which develops from a single flower is a cluster of berries. These are ellipsoid in shape, 10 to 13 mm. long, and 6 to 7 mm. thick.

Little is known concerning the qualities of the wood or of its possible uses. Country people consider it to be fairly good, and useful in general construction.

PLATE - 2/3 natural size.



ANONACEAE

Anona muricata L.

Guanábana, Sour sop.

The guanábana is native to the West Indies, but has been widely distributed through the tropics because of its edible fruit. It is found in gardens, along the roads, and in pastures throughout the island up to 3,000 feet in elevation.

It is a small quick growing shrubby tree, 4 to 10 meters high with grayish-brown slender twigs.

The leaves are obovate-oblong, occasionally elliptic-oblong, usually short pointed at the apex, and acute or somewhat rounded at the base. They are 8 to 15 cm. long, and 3.5 to 7 cm. broad, green and lustrous above, and rather dull beneath, with pockets in the axils of the lateral veins. The leaves give off a strong scent when crushed.

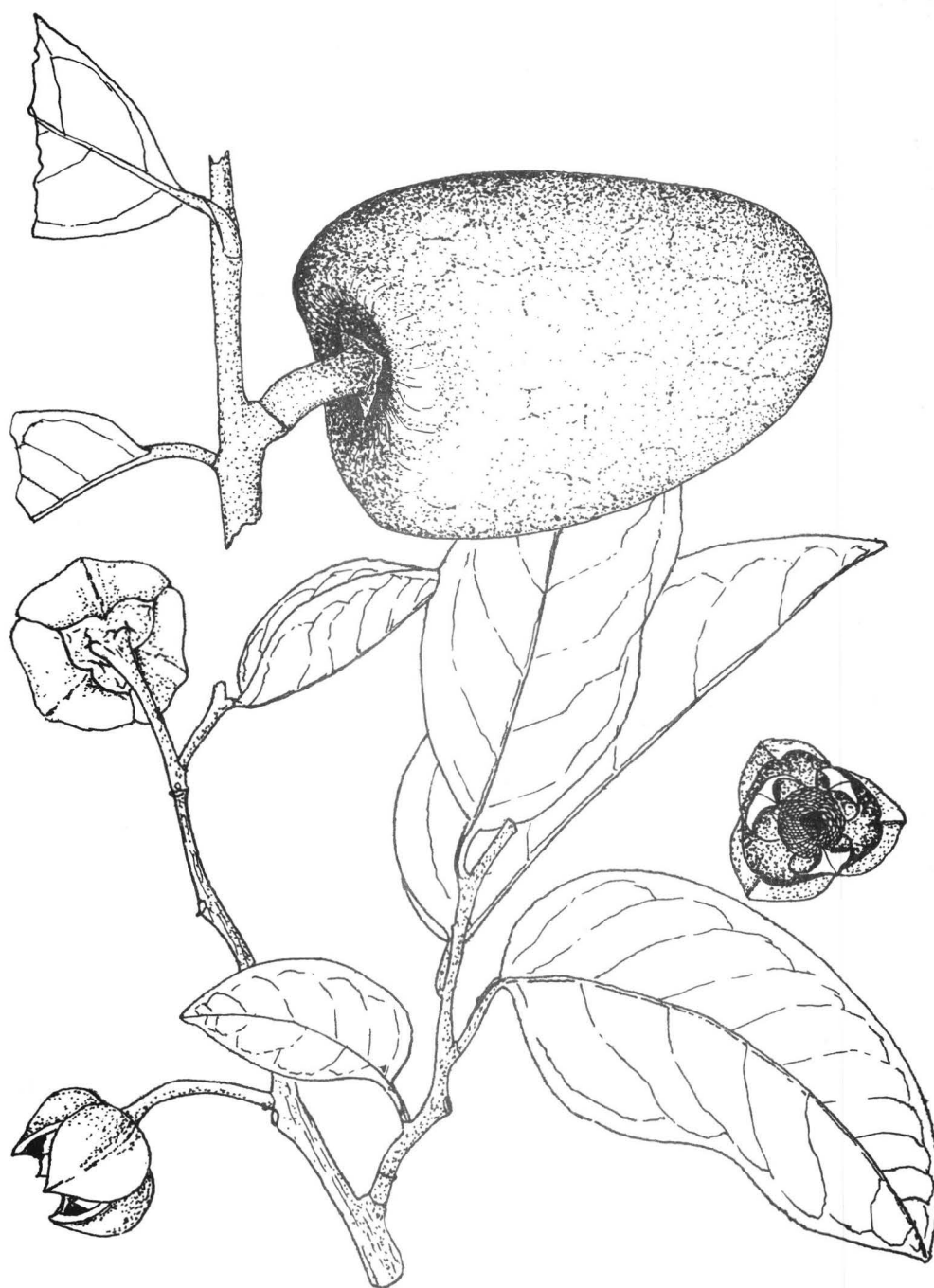
The cream-colored flowers are borne on stout peduncles. The petals are concave, thick, and fleshy, the outer ones being broadly ovate, their edges touching in the buds. They range from 2.8 to 4 cm. in length.

The fruits vary in form from kidney-shaped to ovoid, weighing from 4 to 6 pounds and sometimes as large as a child's head. The skin is dark green, areolate, and covered with fleshy, curved prickles. The white, juicy pulp is pleasantly sub-acid and is used for flavoring ices, in the preparation of a pleasant cooling drink, or it is eaten alone when ripe. Embedded in the pulp are several brown or black oblong-elliptic seeds about 1.5 cm. long.

The wood is soft, light and non-durable, and has no special use.

Propagation by seed is carried out readily.

PLATE - 1/2 natural size.



ANONACEAE

Anona glabra L.

Coyur, Pond apple, Corkwood,
Alligator apple.

This tree is found in southeastern United States, throughout the West Indies, Central America, South America, the Galápagos Islands, and on the west coast of Africa. Only small specimens are found in Puerto Rico, occurring along the borders of the mangrove swamps and marshes and on the banks of streams at low elevations.

It is a short-trunked, deciduous tree, sometimes attaining a height of 15 meters and a diameter of 4.5 dm., with a thickened enlarged base, sometimes forming buttresses. The dark reddish-brown bark is divided by broad, shallow fissures.

The leathery, alternate leaves are oblong-elliptic to ovate in shape, and 6 to 18 cm. long. They are bright green on the upper surface, somewhat paler beneath, and they possess a prominent midrib.

The globose flowers on short stout stems, open from an ovoid 3-angled bud. The six, fleshy petals are arranged in two series. They are a yellow or dirty-white color on the outer side, and the outer row of petals is colored deep red at their bases within. Stamens are numerous.

The large ovoid fruit, about 6 to 12 cm. long, is smooth and of a yellow color with brown blotches when fully ripe. The fleshy pulp is aromatic, but not edible.

The wood is light brown streaked with yellow. It is weak, soft and non-durable. The wood, especially that of the roots, is very light and cork-like, and is used for floats for fishing-nets and for bottle stoppers.

PLATE - natural size.



ANONACEAE

Anona reticulata L.

Corazón, Bullock's heart,
Custard apple

This tree has been widely distributed throughout the tropics because of its edible fruit. It is found along the roads, around houses, in pastures and woodlands throughout Puerto Rico, but more commonly in the drier sections.

It is a small, spreading, deciduous tree, growing to 9 meters in height. The grayish bark is shallowly grooved, and the young twigs are yellowish pubescent.

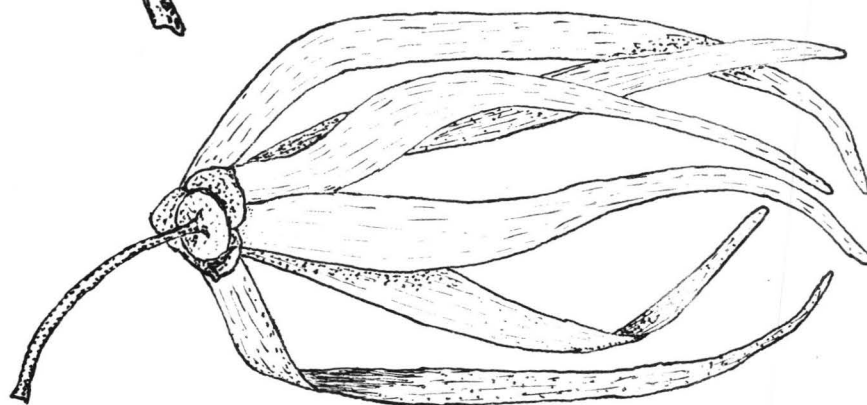
The simple, alternate leaves are oblong to oblong-lanceolate, pointed at the apex and acute or rounded at the base. They are 10 to 20 cm. long, and 2 to 6 cm. broad. It is said that the leaves yield a blue or black dye.

The narrow, greenish or yellowish flowers occur several in a cluster on drooping stems. The petals number 6, in two series; the outer petals fleshy, oblong, 2 to 3 cm. long, keeled on the inside and with a dark purplish blotch at the base, and the inner petals minute.

The large brownish-red fruit is rounded, variable in shape and size, 10 cm. or more in diameter, with a yellowish, granular, very sweet and edible pulp. The fruit is said to be a remedy for dysentery, and the pulp is applied as a poultice to reduce the inflammation of sores and to bring boils to a head. There is a superstition among some people in Ceylon that the fruit causes leprosy. The dark brown, shiny seeds are oblong in shape and from 12 to 15 mm. long. In Central America the powdered seeds are applied to kill lice.

The brownish wood is light and weak and has no special use; the bark contains a strong fiber.

PLATE - 2/3 natural size.



ANONACEAE

Canangium odoratum (Lam.) King

Ilang Ilang, Ylang Ylang.

This species, native to the East Indian region, was introduced into Puerto Rico and many other tropical countries because of its sweet smelling flowers.

There are no old specimens on the island, but in India it is said to attain heights of over 35 meters. It is a medium-sized to rather large, evergreen tree with drooping branches which turn up at the ends.

The alternate leaves are oblong-ovate, with a pointed apex and usually rounded base, 12 to 20 cm. long.

The pendulous flowers, greenish at first and turning yellow when mature, are borne in the axils of the leaves. The petals are long lanceolate, 3 to 6 cm. long and about 1 cm. wide, and have a penetrating and very agreeable odor which persists even in dried specimens. The flowers yield a valuable perfume oil.

The fruit is a cluster of oblong, greenish berries borne on the elongated flower stalk. They are about 2 cm. long and look like olives. The seeds are very small, about 90,000 making a pound.

The wood is soft and white and not very durable. In Samoa, it is used for small canoes, while the Malaysians hollow out the trunks for drums or tom-toms. The wood is also suitable for packing chests.

In the Philippines and other islands of the East Indies, the flowers are distilled for the oil. A full grown tree is considered to yield about 20 pounds of fresh flowers during a season. Approximately 200 pounds of flowers produce one pound of the essence. The annual export of this oil from the Philippines alone is valued at over \$100,000.

PLATE - natural size.



HERNANDIACEAE

Hernandia sonora L.

Mago, Toporite.

The Mago is found in Cuba, Puerto Rico, the Lesser Antilles from Montserrat to Trinidad, and in continental tropical America. It occurs in moist habitats in Puerto Rico at lower and middle elevations. It is rare on the island, but several trees may be seen along the El Yunque road just south of the town of Mameyes.

It is a large evergreen tree, growing to 25 meters in height and attaining diameters up to 10 dm. The bark is thick, buff-colored and covered with short corky warts. The trunks of large trees may have small buttresses.

The alternate, simple leaves are ovate to nearly round, 12 to 25 cm. long, and 7 to 16 cm. wide. The long, stout petioles are usually attached inside of the edge of the leaf. They are entire and 3-to 7-nerved.

The yellowish or grayish flowers are borne in loose cymes and are not very conspicuous. Male and female are borne separately, but on the same tree.

The fruit is a black, ovoid, ridged drupe about 3 cm. long, enclosed in a peculiar bladder-like, thin-walled case which develops from the calyx. This is pale yellow or sometimes tinged with red, and when mature has the pleasant odor of well ripened apples.

The nearly white wood is light and soft, and easily worked. Its scarcity prevents its use on the island, but in Trinidad it is in considerable demand. The sap of this tree is said to be a satisfactory depilatory.

The species is readily propagated from seed and grows fairly rapidly.

PLATE - 2/3 natural size.



LAURACEAE

Persea gratissima Gaertn.

Aguacate, Avocado, Alligator pear.

This tree, planted almost everywhere on the island, has a wide distribution throughout tropical and subtropical America. It can be separated into three main groups which are divided into numerous varieties. The Mexican group is indigenous to Mexico; the Guatemalan group to all evidence originated at high elevations in Central America; and the Antillean group, according to some authorities, originated in Colombia and Panama. It has been introduced into almost every tropical country and can be found in the Hawaiian Islands, Ceylon, Queensland, Madeira, Natal, and the Canary Islands.

It grows to 18 meters tall and 6 dm. in diameter.

The alternate, coriaceous leaves are oblong to elliptic or oval, slightly broader above or below the middle, and copiously pubescent beneath when young. They vary from 7 to 25 cm. in length and 3 to 16 cm. in width. They are deciduous immediately before or during flowering, and are faintly aromatic when crushed.

The small, greenish yellow flowers, borne in axillary or terminal panicles, begin to appear during the month of February and continue opening as late as April and May. They are very numerous and are frequently visited by bees and flies. Only a few ever mature into fruit.

The fruit appears during April and May, but matures in late June, July and August. It is considered as one of the best of all tropical fruits. There are in cultivation many varieties differentiated by their shape, color, size, and flavor. The fruit is a pyriform drupe, but may be subglobose, oval or ovate. It varies from 8 to 20 cm. in length. When mature, it is of a yellowish green color, very nutritious and full of oil. The flesh is of the consistency of butter, and is very agreeable to the taste. It is eaten simply with salt or made into salads. An ice-cream is made from the mature fruit. The pulp yields a commercial oil used for making soap and for fuel. A reddish-brown indelible dye obtained from the large seeds is used for marking linen. Standley reports that in some regions the flesh is employed as a remedy for diseases of women.

The fruit is difficult to export since it is very susceptible to injury by bruising. It should be picked just before it is ripe and kept a few days until soft. It is a tropical fruit of considerable promise although problems relative to its asexual propagation must be solved before its culture becomes more generalized.

The wood is pale reddish-brown, fine-grained, and easy to work, but is susceptible to rot and insect attacks.

The tree is propagated mostly from seed, but the best way to reproduce choice varieties is by budding or grafting.

PLATE - 2/3 natural size.



LAURACEAE

Ocotea spathulata Mez.

Nemocá, Nuez moscada macho.

This species is found only in Puerto Rico where it is confined to the Luquillo range and the mountains just east of Cayey, usually more than 300 meters above sea-level, and extending to the very tops of mountain peaks.

It grows to 20 meters tall and 8 dm. in diameter, and is quite distinctive due to the clustering of the leaves near the ends of the twigs. The bark is light gray in color and fissured on the older trees. The trunk is usually buttressed at the base. All parts of the tree, when cut or bruised, give off the spicy smell typical of the laurel family.

The leaves are simple, entire, leathery, widest beyond the middle, short-pointed or rounded at the apex, acute at the base and short-petioled. They are 7 to 12 cm. long, and 2.4 to 6 cm. broad.

The fertile flowers are borne in axillary or terminal panicles, shorter than the leaves and covered with short rusty-brown hairs. They are not conspicuous since there are no petals, and the sepals are small and greenish in color.

The fruit is an ellipsoid or nearly globose drupe, 2 to 3.5 cm. long, seated in an often double-margined cupule which is the enlarged flower. When mature the inside of the fruit is sticky and of a clear pink color.

The wood is hard, heavy, durable, and is valued for furniture and many other uses. There is considerable variation in the color of the wood ranging from light brown to almost black; this variation often occurring in strips or bands on the same piece.

PLATE - 2/3 natural size.



CAPPARIDACEAE

Capparis cynophallophora L.

Burro, Sapo, Bejuco inglés,
Black wattle.

This species is found in Florida, all of the West Indies, northern South America, Central America, and Mexico. It is fairly common in thickets and on the coastal hills in dry sections of Puerto Rico and the adjacent islands.

It is a shrub or small tree growing to 20 meters in height, with a trunk diameter reaching 2 or 3 dm., but only small specimens are now found on the island. The slender angular twigs are densely scaly and the dark-red brown bark is slightly fissured and broken into small irregularly-shaped divisions.

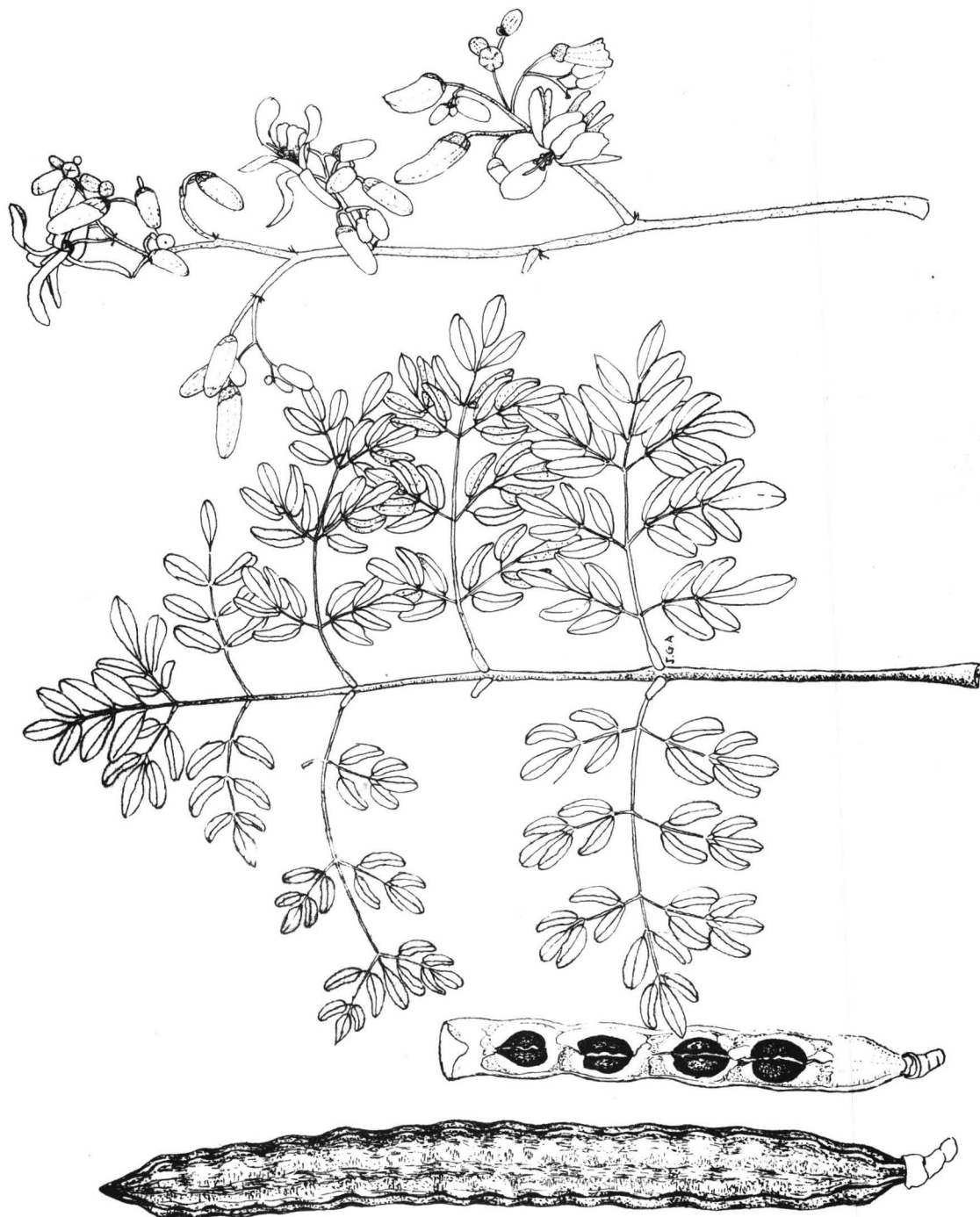
The alternate, leathery leaves are 5 to 10 cm. long, oblong-lanceolate, usually rounded and notched at the apex, and the edges are turned under slightly. They are smooth, lustrous, light yellow green on the upper surface, and covered below with fine rusty scales. The midrib is prominent, but the lateral veins are not conspicuous.

The fragrant flowers open from four-angled buds in few to several-flowered clusters. The sepals and flower stems are densely scaly; the petals are white, contrasting with the numerous long purple stamens and the yellow anthers.

The brown scaly drooping pods are usually long and narrow, ranging in length from 8 cm. to 3.5 dm. and in thickness from 6 to 8 mm. They are terete and contracted between the seeds. They rupture irregularly on maturing, disclosing a bright red interior, to release the light brown seeds which are about 3 cm. in length.

The hard, heavy wood is of a fine texture, yellow in color with a faint tinge of red. It is used to little extent on the island, mostly for fuel or charcoal.

PLATE - natural size.



MORINGACEAE

Moringa oleifera Lam.

Ben, Angela, Hoja de sen,
Jazmín francés, Horseradish tree.

This species, a native of the Orient, has been widely scattered through the tropics. In Puerto Rico, it is planted throughout the island, but largely in the drier sections, and to a certain extent, it has escaped from cultivation.

It is a small to moderate-sized tree, attaining heights up to 9 meters. It is deciduous, with slender, finely hairy twigs, easily broken branches, and gray, corky, deeply fissured bark.

The feathery foliage consists of large bipinnate or tripinnate leaves, from 3 to 6 dm. long. The numerous, thin leaflets are oblong, entire and from 1 to 2 cm. long.

The numerous, fragrant flowers occur in large, axillary panicles. The flowers are slightly irregular, and have five creamy white petals and five stamens.

The fruit is an obtusely three-angled, pod-like capsule, 2 to 5 dm. long, which dehisces to release numerous three-winged seeds. The most valuable product of the tree obtained by pressing the seeds is a clear, pleasant tasting oil, called "ben oil". It is used for the lubrication of delicate instruments such as watches, and since it never becomes rancid and possesses great power of absorbing and retaining the most fugitive odors, it is also used as a basis for fine perfumes.

In India, the roots are used as a substitute for horse-radish, the leaves are used for vegetable curries as well as for seasoning and in pickles, and the unripe pods serve as a vegetable curry, being boiled and sliced like green beans. The flowers and bark are employed in medicine and the crushed bark roots are applied externally to the skin as a rubifacient. Also, in the East, the branches are often lopped for fodder especially for camels.

The tree is propagated by seeds or large cuttings, the latter rooting well if they are watered thoroughly. The tree coppices vigorously.

The wood is soft and useless, but the tree has many uses especially in its native home.

PLATE - leaves and flowers x 2/3; pods x 1/3



CUNONIACEAE

Weinmannia pinnata L.

Oreganillo

This species has a wide range, occurring in Cuba, Jamaica, Hispaniola, in the Lesser Antilles from St. Kitts to St. Vincent and on the mainland from Mexico to Brazil. It is found here and there in mountain forests at high elevations in Puerto Rico.

On exposed sites it is a shrub from 2 to 4 meters high, but under better growing conditions it becomes a tree, growing to 15 meters high and 3 dm. in diameter. The young branches are covered with short rust-colored hairs.

The leaves are opposite, odd-pinnate, with usually from 9 to 17 leaflets, oblong to ovate or somewhat obovate. The leaflets are sessile, obtuse at the apex, narrowed at the base, 6 to 25 mm. long and finely toothed above the base. The species is most easily recognized by the wings on the rachis between the leaflets.

The small flowers are borne in many-flowered racemes usually longer than the leaves.

The fruit is a small ovoid capsule containing several seeds about 1 mm. long.

The wood is hard, heavy, red in color, and appears to have good working qualities, but being confined to the higher inaccessible portions of the island it has not been utilized to any great extent. A gum often exudes from the astringent bark. Use of the bark as an adulterant of quinine has been reported.

PLATE - 2/3 natural size.



AMYGDALACEAE

Hirtella triandra Sw.

Teta de burra

This species occurs in Cuba, Jamaica, Hispaniola, the Lesser Antilles from St. Kitts to Trinidad, and in continental tropical America. It is found sparingly in Puerto Rico in forests, hill-sides, and river-banks in wet or moist habitats, ascending to the higher elevations.

It is a small evergreen tree, but may reach heights of 15 meters. The young twigs are slender and hairy. The bark of the trunk is smoothish and rather light-colored.

The simple, alternate leaves are lanceolate to elliptic or rarely broader beyond the middle, the tips usually long-pointed, and narrowed or rounded at the base. They are 5 to 15 cm. long and 2.5 to 6 cm. broad, entire, and somewhat finely hairy beneath. The petioles are short, from 2 to 4 mm. in length.

The rather small flowers are borne in long, terminal or axillary, narrow panicles. The five whitish to pinkish petals soon drop off, leaving the five short sepals and long purplish stamens.

The fruit is an oblong, thin-fleshed drupe, 2 to 2.5 cm. long and purplish in color at maturity. It contains one hard, pointed, and finely grooved seed. It is edible, but the thin pulp provides little more than a sweetish flavor.

The light brown wood is hard, tough, and heavy and would be of value if it were more abundant.

PLATE - 2/3 natural size.



AMYGDALACEAE

Hirtella rugosa Pers.

Teta de burra cimarrona,
Teta de burra, Icaquillo

This tree is native only to Puerto Rico where it is found in the mountain forests at middle to higher elevations.

It is a small tree or shrub, growing to 6 meters in height, and very conspicuous because of its drooping long-haired branches.

The simple, entire, alternate leaves are lanceolate-ovate to broadly ovate, pointed at the apex, rounded or usually heart-shaped at the base, 3 to 9 cm. long and 2 to 5 cm. broad. They are shiny above and duller beneath, with long hairs on the midvein above, the veins on the under surface, and often on the leaf margin. The petioles are very short.

The flowers are small but attractive because of the bright red or rose red color of the petals.

The fruit is a small oblong drupe, about 1.5 cm. in length and red at maturity. It is edible and has a rather pleasant taste, but like our other species of Hirtella it has very little flesh.

The wood is hard, strong, and heavy, but finds little use except in the round because of its small size.

PLATE - 2/3 natural size.



MIMOSACEAE

Pithecellobium dulce (Roxb.) Benth.

Guamá americano, Madrás
thorn, Manila tamarind.

This tree is native to tropical America from Mexico to Venezuela, but has been distributed to many other tropical countries. It has been planted along some of the streets and around houses in Puerto Rico for shade and ornament.

It is a small or medium-sized evergreen tree, growing to 18 meters in height. The light gray bark is smooth. The slender, smooth branchlets are drooping, usually armed with stipular spines in pairs, and covered with many small yellowish lenticels.

The leaves are bipinnate, consisting of one pair of pinnae, each with one pair of thin, leathery, pale green leaflets, 5 cm. long or less and very inequilateral. In some places the leaves are used medicinally.

The small, yellowish-white flowers are grouped in heads of about 20 to 30 flowers each on long, drooping, paniced racemes. The stamens are very numerous, about 50 to each small flower. The flowers are frequented by bees and yield a good quality of honey.

The twisted, often spiral pods, about 12 cm. long, turn red on ripening, and contain 6 to 10 shiny black seeds, surrounded by a whitish, sweet, edible pulp. This is used in the preparation of a drink similar to lemonade. Live stock of all kinds relish the pods, and in India, monkeys are said to eat them greedily.

The hard and heavy, dark brown heartwood is strong, durable and takes a high polish, but is brittle and not easily worked. It is used for general construction purposes, fence posts, and fuel. The bark contains about 25 per cent of tannin and is used to a considerable extent in Mexico. It also yields a yellow dye. It is used in domestic medicine because of its astringent properties. The transparent and deep reddish brown gum which exudes from the trunk makes a good mucilage when dissolved in water.

The tree is very resistant to drought, stands fairly dense shade, grows rapidly, and coppices well. It is satisfactory for hedges since it stands clipping well, and it makes an excellent avenue tree.

PLATE - 2/3 natural size.



MIMOSACEAE

Samanea Saman (Jacq.) Merrill

Samán, Dormilón, Rain tree

This tree is native to Central and South America and has been widely naturalized throughout the West Indies and other tropical countries. In Puerto Rico, it has been planted along roads and in pastures about the island in both wet and dry sections.

It is a large, wide-spreading, deciduous tree attaining a height of 25 meters and a diameter up to 1-1/2 meters. The grayish bark on older trees separates into strips.

The leaves are bipinnate, often 4 dm. long, with 2 to 6 pairs of pinnae, each bearing 2 to 8 pairs of leaflets. A distinguishing characteristic is a small circular gland on the leaf-rachis between each pair of pinnae.

The flowers are small, but the masses of long pink stamens in the flower clusters make the tree very attractive when in bloom.

The brown, woody, rather flat pods, about 1.5 to 2 dm. in length contain a quantity of sweet sugary pulp which is relished by cattle. Seeds number about 2,500 per pound.

The wood from old trees is hard, heavy, brown, very cross-grained and difficult to work. Although opinions vary greatly in other countries as to the utility of the wood, it is not very durable and has been used on the island for firewood only. In Trinidad, it is employed in the making of furniture.

The tree is readily propagated from seed, and may also be raised from cuttings. Growth is very rapid. In Venezuela it has been used to some extent as coffee and cacao shade, but is not very satisfactory for those purposes. It is excellent for roadside shade in dry localities, but in hot, moist regions at low elevations, it assumes great size, often becoming top-heavy and somewhat dangerous along roads or near houses.

The derivation of the name "rain tree" is attributed to various origins. Some say the fact that the grass is greener beneath the tree during droughts gave rise to the belief that the tree mysteriously produced rain at night, others that it is derived from the falling liquid excreta of Cicadeae insects which inhabit the tree in Central America, and still others believe the fact that the leaves close up in cloudy weather is responsible for the name.

PLATE - 3/4 natural size.



MIMOSACEAE

Albizzia Lebbeck (L.) Benth.

Cassia amarilla, Women's tongue,
Siris, East Indian walnut, Tibet
tree.

This tree, native of the Old World tropics, has been introduced into most tropical countries, and is widely planted throughout the island. It has already become naturalized in Puerto Rico, especially in the dry sections, and is found scattered on pasture lands.

It is a medium-sized to large, spreading, deciduous tree, growing to 15 meters high, although in forest stands it has a long, straight bole and may attain greater heights. The bark is dark gray, rather rough with irregular cracks, and red or crimson colored inside.

The bipinnate leaves are large, often 4 dm. long, with 2 to 4 pairs of pinnae and a petiole 2 to 10 cm. long bearing an oblong sessile gland. Each pinna bears 4 to 9 pairs of thin, nearly sessile, oblong leaflets from 2 to 4 cm. long.

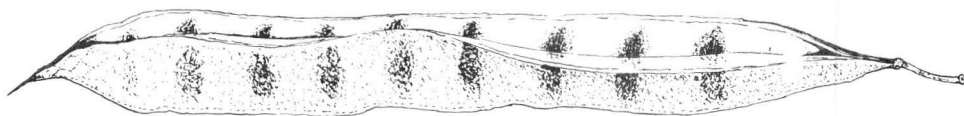
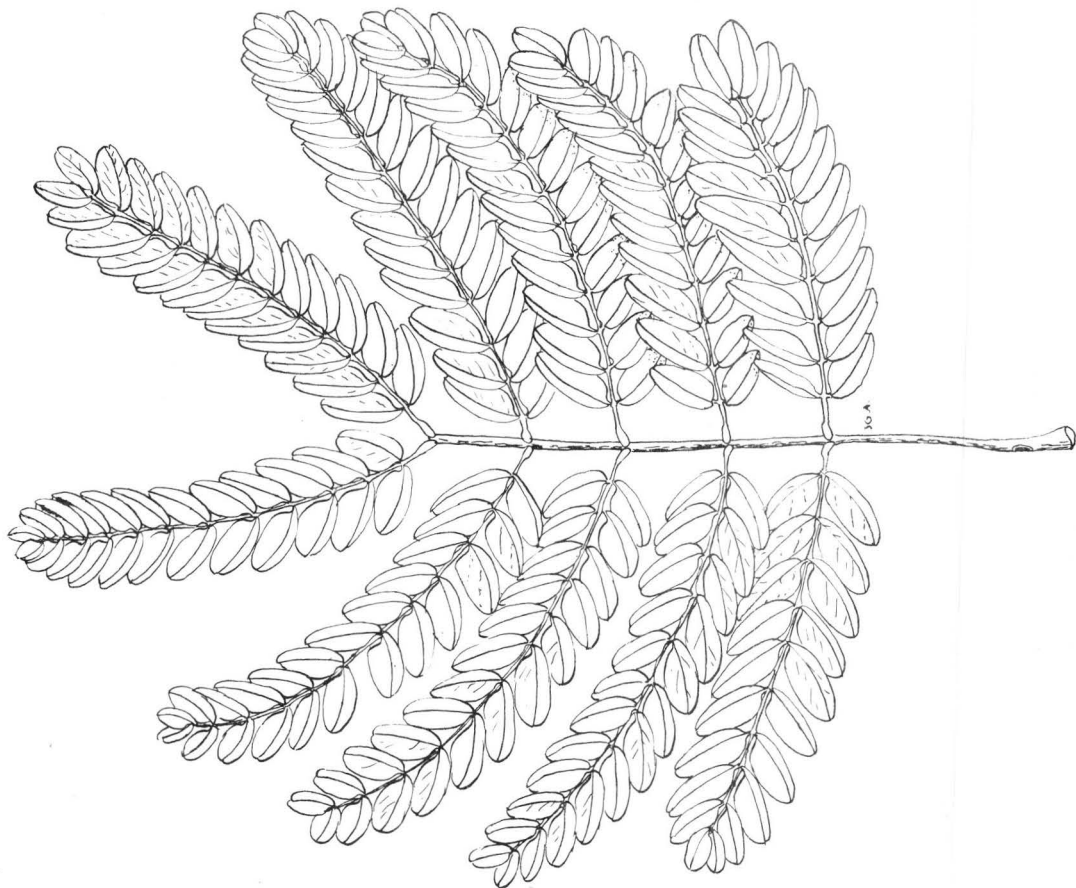
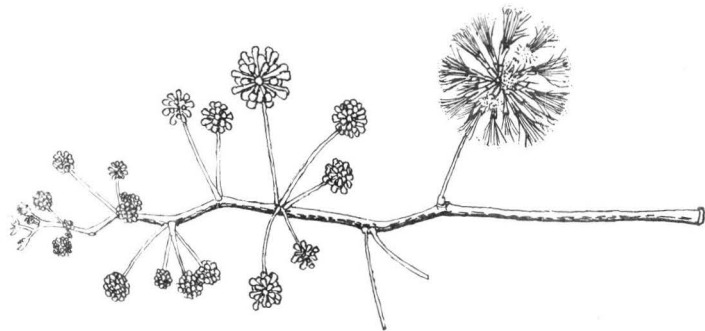
The creamy-colored flowers are borne prolifically in sub-globose umbels, and they are very conspicuous against the new foliage. The long stamens comprise the showy part of the flower, but attention is also attracted by the heavy fragrance of the bloom.

The fruits develop rapidly in great abundance, the pods turning yellow or straw-colored on ripening. They are broad and flat, thin, 1.5 to 3 dm. in length, and they contain 6 to 12 light-brown, compressed, hard seeds, the outlines of which are very prominent on the outside of the pods. The fruits are long persistent on the branches, covering the tree after the leaves fall with what, at a distance, appears to be dry, light-yellow foliage. Their continual movement and rattling has given rise to the name, "women's tongue".

The heartwood is dark brown, somewhat mottled, seasons well, works easily and takes a good polish. In India, it is used for paneling, furniture, and general construction purposes. The bark is used for tanning and various parts of the tree are used for medicinal purposes.

The tree is propagated readily from seed or cuttings. It grows readily on a great range of sites and does well in the driest parts of the island. Its main use in Puerto Rico has been for shade or ornament.

PLATE - 2/3 natural size.



MIMOSACEAE

Albizzia procera (Willd.) Benth.

Albizzia, White siris.

This native of Southern Asia has only recently been introduced into Puerto Rico and is found only occasionally planted along roadsides or in gardens.

It is a large tree with a long clean bole, probably attaining heights up to 30 meters on favorable sites. Relatively few branches are produced, resulting in a rather light crown. The bark is smooth, light yellowish or greenish gray. It exfoliates in thin flakes, and is red inside.

The alternate bipinnately compound leaves consist of from 2 to several pairs of pinnae, each pinna containing 2 to 10 pairs of leaflets 3 to 5 cm. in length.

The yellowish white flowers with shorter stamens than those of Albizzia Lebbeck are borne in umbels in large panicles.

The pods commence forming soon after flowering, and when ripe are of a rich red color. They are thin and strap-shaped and range in length from 1 to 2 dm. They dehisce to release 6 to 12 seeds. When newly mature, the masses of red pods against green foliage are quite attractive, but if planted on lawns the pods and the large leaves constitute a nuisance in the considerable litter which drops from the tree. The flat, hard, seeds are smooth and greenish-brown, from 8,000 to 13,000 per pound. They retain their viability for a year.

The sapwood is whitish and thick. The heartwood is brown with streaks of darker or lighter color and is used in India for houseposts, agricultural implements, and other construction.

The seeds germinate readily, and the tree can also be propagated by cuttings. Growth is very rapid. The species is a light demander and grows best on low moist sites such as alluvial lands along a river.

PLATE - 2/3 natural size.



MIMOSACEAE

Vachellia Farnesiana (L.) Wight & Arn.

Aroma

This tree is found in Florida, throughout the West Indies, in continental tropical America and in the Old World tropics. It grows at low elevations in Puerto Rico, largely in dry habitats.

It is a spiny shrub or small, spreading, much-branched tree, rarely attaining heights of 9 meters. The twigs are glabrous or nearly so, and the bark is dark colored.

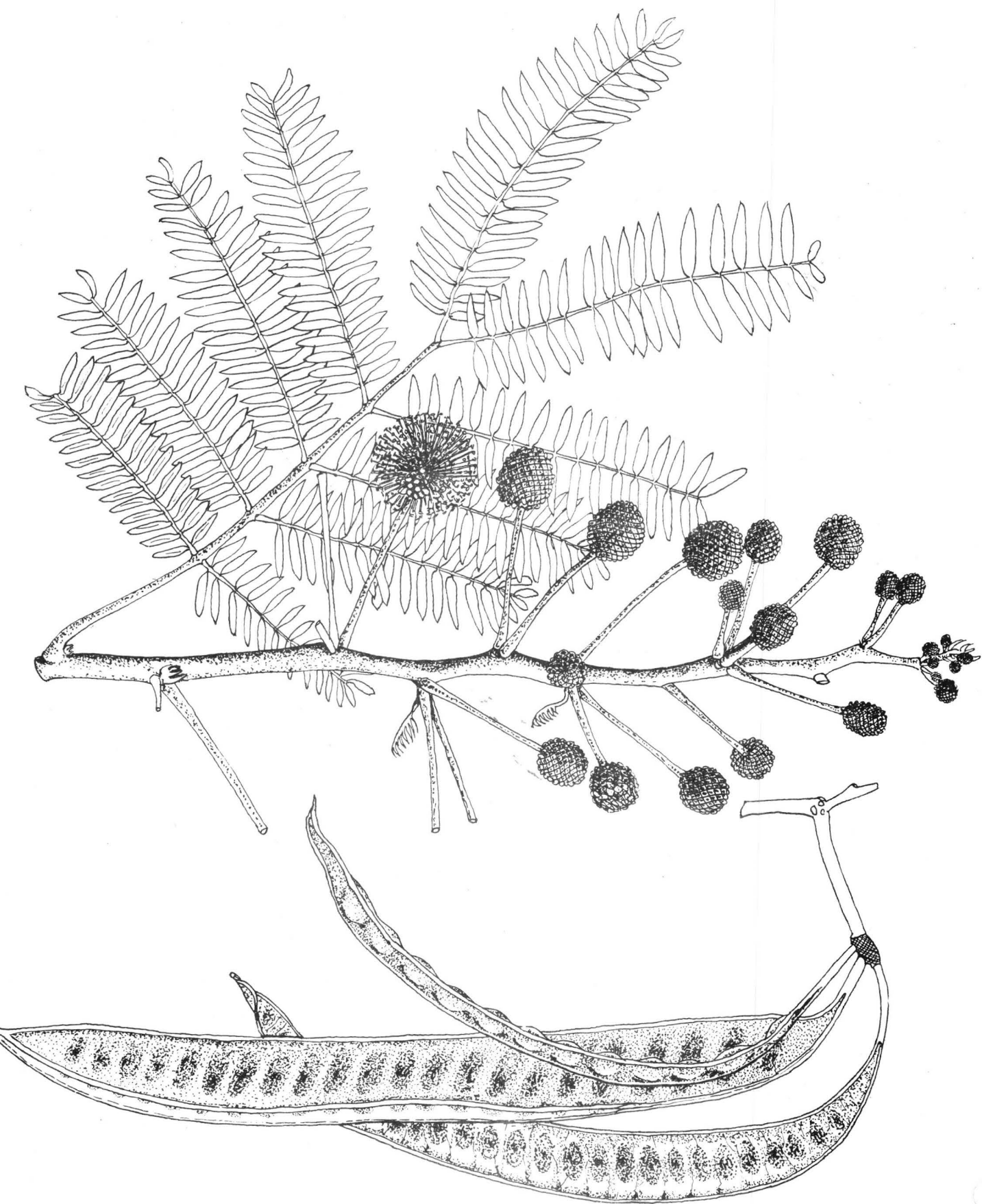
The leaves are bipinnately compound and 5 to 10 cm. long. Each leaflet is made up of 2 to 6 pairs of pinnae, each pinna bearing 10 to 25 pairs of linear or linear oblong leaflets 3 to 5 mm. long. There is a small gland on the petiole and the stipular spines are whitish, rigid, and 0.5 to 5 cm. long. The leaves are of value as forage but are said to impart a bad flavor to the flesh. When dried and pulverized they are applied sometimes as a dressing for wounds.

The fragrant flowers occur in bright yellow heads about 12 mm. in diameter. The flowers are known in commerce as "cassie flowers" and are used in the manufacture of perfume. In tropical America the flowers are often laid between linen to impart their perfume to it. In Mexico, an ointment made from the flowers is used as a remedy for headaches, and their infusion for dyspepsia.

The fruit is a somewhat curved, nearly terete pod 4 to 7 cm. long and about 1 cm. thick. The green fruit is very astringent, and a decoction is employed for dysentery and inflammations of the skin or mucous membrane. The viscous juice of the pods is similar to gum arabic and is used in some places as mucilage or for mending broken china. The fruit is often employed for making ink.

The wood is used to little extent in Puerto Rico except for firewood, primarily because of the small size of the tree. Both the bark and the fruit contain tannin and are used for tanning or dyeing.

PLATE - 2/3 natural size.



MIMOSACEAE

Leucaena glauca (L.) Benth.

Zarcilla, Wild tamarind,
Lead tree.

Zarcilla is said to be native to the American tropics, but is widely distributed in all tropical countries. It is common on the island, especially in the dry sections where it thrives along the roads and in old fields and makes itself very much a weed.

It is a quick-growing, deciduous shrub or small tree up to 20 meters in height.

The bipinnate leaves are 1 to 2 dm. long, with 3 to 10 pairs of pinnae, each of the latter with 10 to 20 pairs of thin, oblong or lanceolate, inequilateral leaflets, 8 to 10 mm. long, light green above and paler beneath. Cattle relish the foliage and eat it without danger, but it is said to be slightly poisonous to horses and mules causing loss of hair from their manes and tails if they are allowed to browse too freely on its leaves and pods.

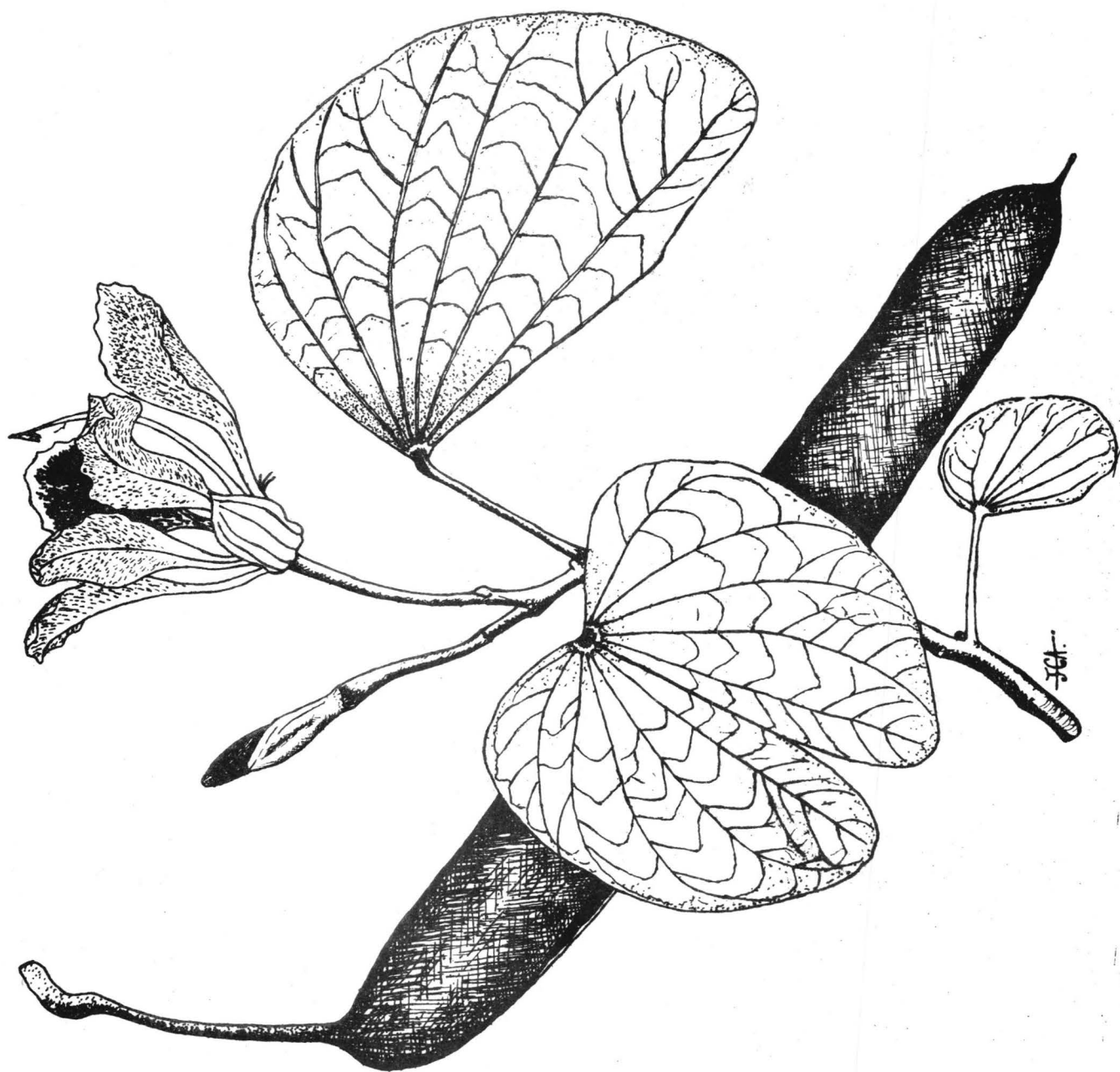
The flowers occur in heads, 1 to 3 in the axils of the leaves, or racemose at the tops of the branches. They are green and inconspicuous, the more showy part of the flower being the whitish stamens extending out from the heads.

The tree fruits prolifically, bearing numerous broadly linear, flat, membranous, two-valved pods 10 to 15 cm. long, and about 1.5 cm. in width. In the Philippines, the young green pods are boiled and eaten as a vegetable. Each pod contains from 15 to 25 elliptic, compressed, shining, brown seeds. In some places, these are softened by boiling, strung on threads, and made into hatbands, necklaces, and similar curios for the tourist trade. In the Philippines, they are occasionally used as a substitute for coffee.

The wood furnishes a good fuel or charcoal and is often managed on a short rotation of 6 to 7 years for this purpose.

It can be propagated readily from seeds and coppices well, the growth of the sprouts being even more rapid than that of the seedlings. The tree stands a fair amount of shade and grows on a variety of soils, although it does best on a deep, rich soil. In India, the tree is used as a hedge plant, while in Java it is valued as coffee-shade. It is also a valuable species for reforesting grass-land with the view of preparing the way for the introduction of timber trees to an area.

PLATE - 7/8 natural size.



CAESALPINIACEAE

Bauhinia monandra Kurz

Mariposa, Flamboyán blanco,
Napoleon's plume.

This species is a native of southeastern Asia, but has been widely distributed in the West Indies and other tropical countries as an ornamental. It is found along roadsides, river-banks, and in thickets where it has become naturalized after planting.

It is a shrub or small tree, growing to 12 meters high, with long, spreading branches and smooth, gray bark. The young twigs are finely hairy.

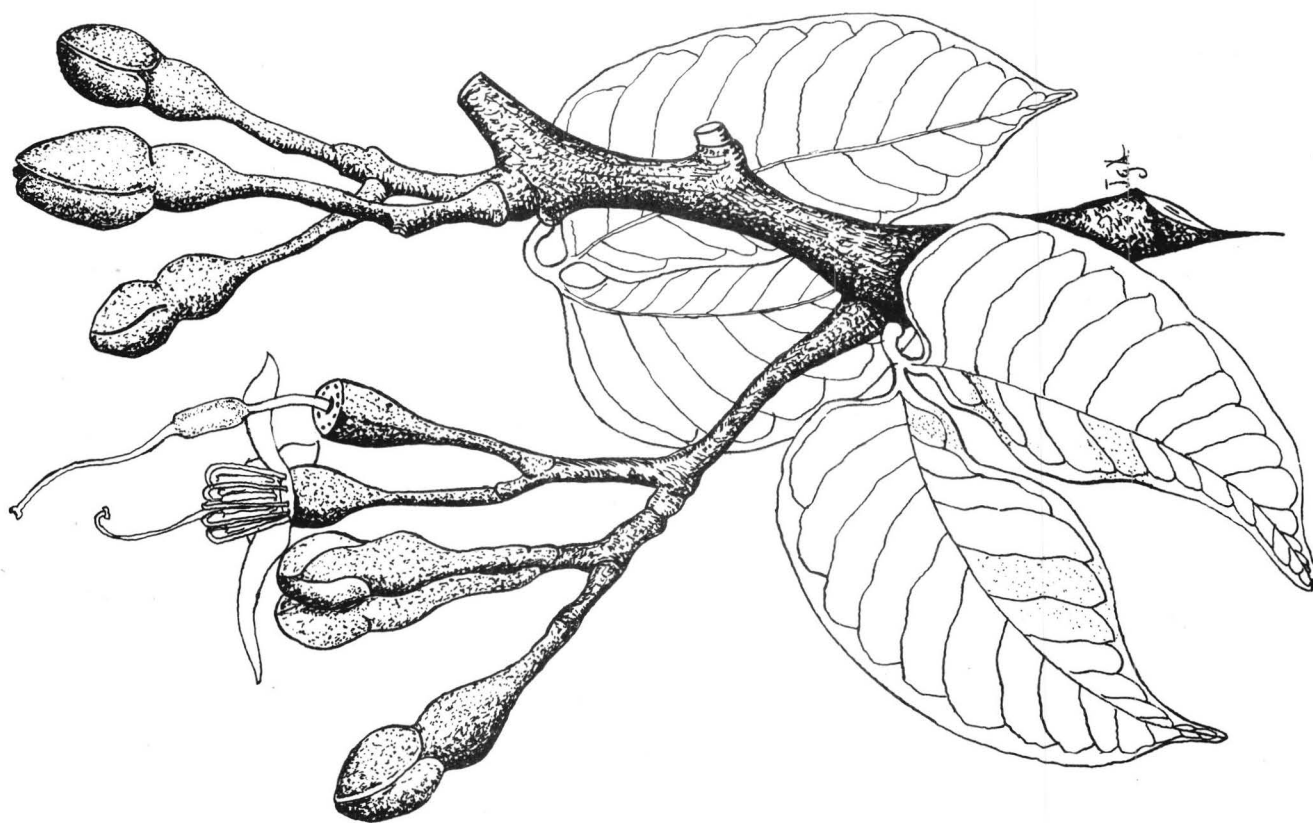
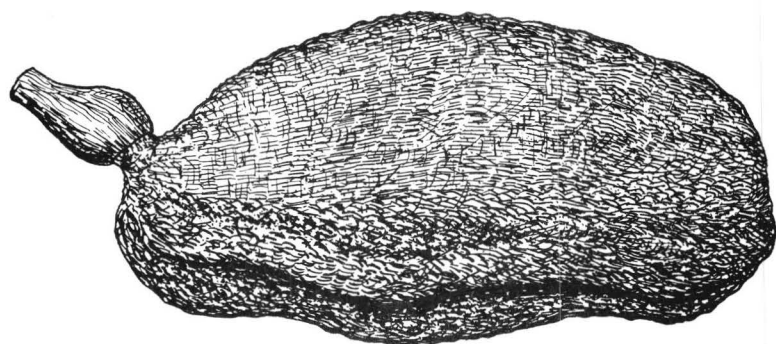
The two-lobed leaves are cleft about half way to the base, and as this is rather suggestive of a butterfly the common name seems well selected. They are broadly ovate or nearly round and more or less heart-shaped at the base. They are 8 to 20 cm. long and rather thick. The petioles are rather stout and range up to 6 cm. in length.

The large flowers occur in terminal few-flowered racemes; petals spreading, long-clawed, of a rose color except one which is spotted with carmine. There is only one large stamen from which the specific name "monandra" is derived. The calyx is finely hairy and split along one side at flowering time.

The fruit is a linear flattened pod up to 22 cm. long and about 2.5 cm. in width; walls thick and the pod opens with considerable force, scattering the seeds. The seeds are about 1 cm. long, flat, brown, and shining.

The wood is brown but is not used on the island as the tree has been planted only for ornamental purposes.

PLATE - 7/8 natural size.



CAESALPINIACEAE

Hymenaea Courbaril L.

Algarrobo, West Indian
locust.

This species has a wide range in the West Indies and continental tropical America. Scattered individuals are found mostly in Puerto Rico in moist districts and at low elevations.

It is a large, usually spreading tree, growing to 30 meters in height and 2 meters in diameter and is one of the important timber trees of the American tropics. The smooth, gray, bark may attain a thickness of 3 cm. on older trees.

The leaves are compound, consisting of a single pair of thick, shiny, inequilateral leaflets, 4 to 10 cm. long at the end of the leaf-stalk, an arrangement which gave rise to the generic name, referring to Hymen, the god of marriage.

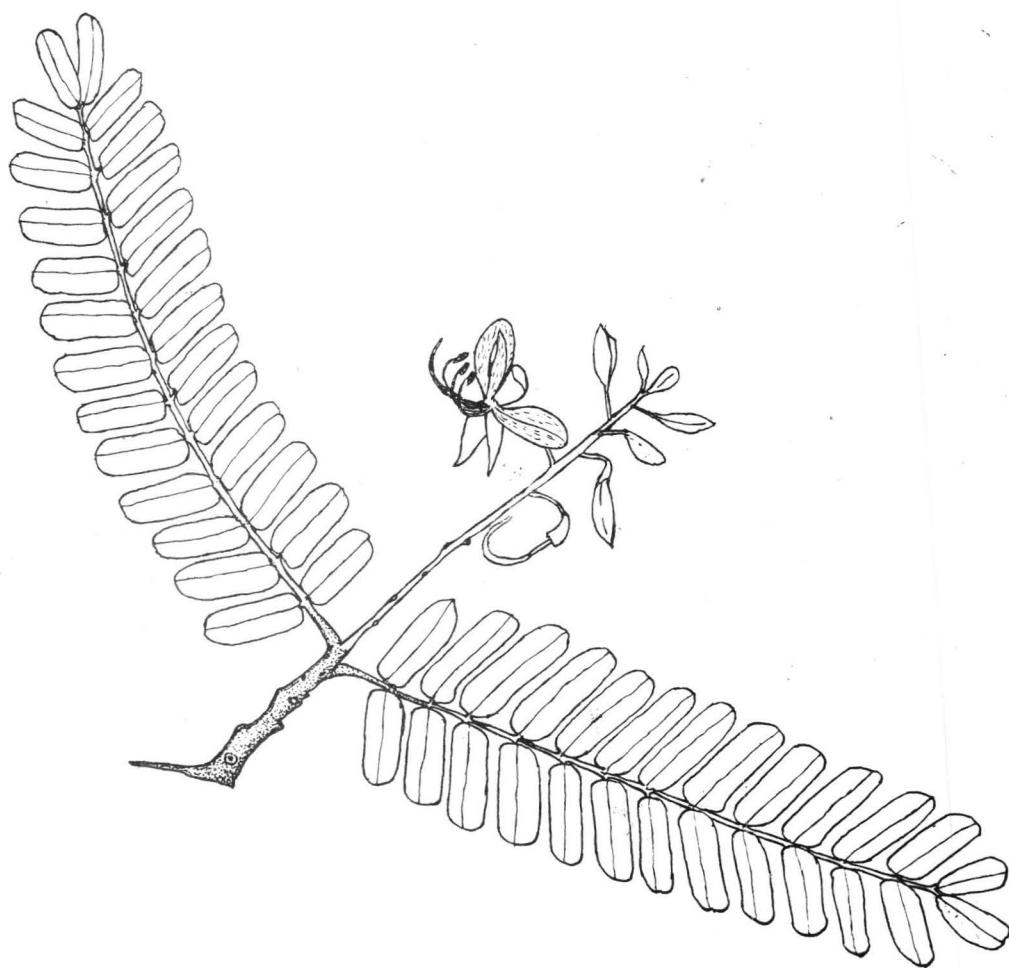
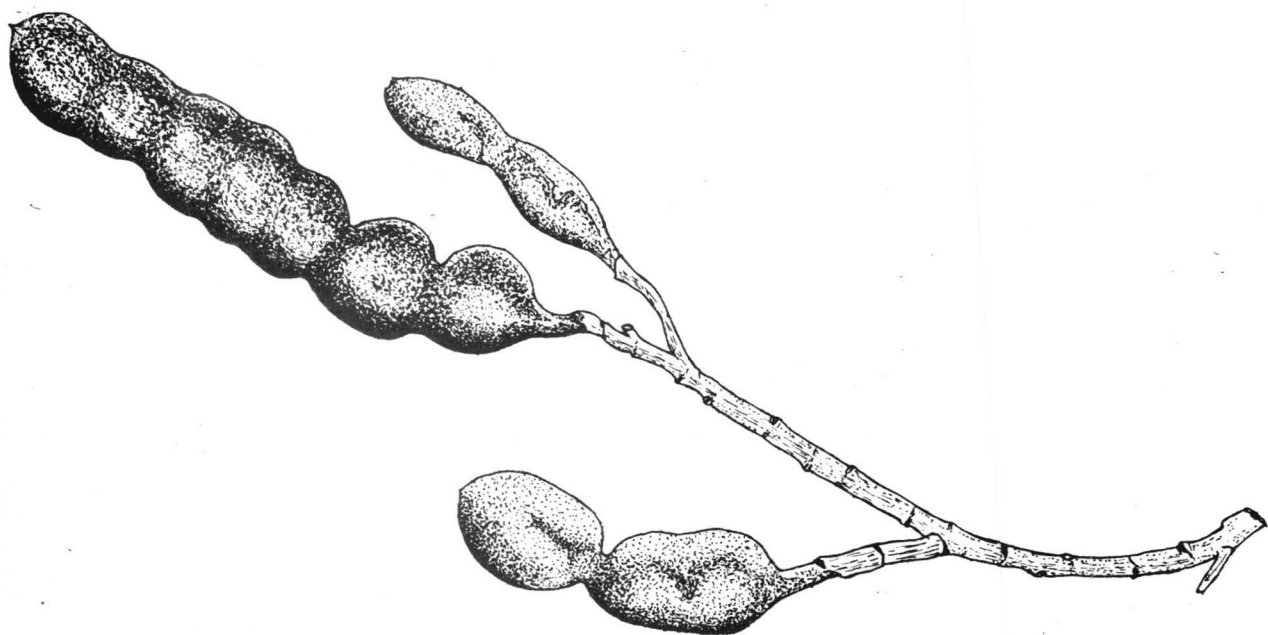
The large, whitish or purplish flowers occur in many flowered panicles. The five petals are thin and dotted; the ten stamens are white.

The fruit is a rough, oblong, dark-brown, woody pod, 5 to 10 cm. long, containing few to several oblong, red seeds embedded in a mealy pulp which is sweet and edible when the pod ripens. Seeds number about 120 per pound. The large seeds gave good results in direct seeding trials in forest plantations on the island, but the resulting seedlings were heavily attacked by field mice which chewed through the stems, cutting off the trees close to the ground.

The dark-brown or orange wood is strong, hard, heavy, tough and fairly durable. It is employed in furniture, carts, and general carpentry. The thick bark is used in single large pieces by the Indians of Panama for making canoes. It is reported that some of these canoes have a carrying capacity of 25 men.

Another product of the tree of commercial importance is a rosin-like gum from the bark which is known as South American copal. Exudations which trickle from the tree to the ground form hard lumps which eventually become buried in the soil. Gatherers dig around the roots and may find as much as a barrelful of these lumps in one place, and sometimes at the site of a long fallen tree this may amount to several barrels. The copal is used primarily in the preparation of special grades of varnish, and also for medicinal purposes, church incense, and for mending broken crockery.

PLATE - 7/8 natural size.



CAESALPINIACEAE

Tamarindus indica L.

Tamarindo, Tamarind.

The Tamarind is said to be native to Abyssinia and Central Africa, but it has long been cultivated by man for its fruit and is widely spread through the tropics and sub-tropics. On the island, the tree is fairly common around houses, along the roads, and on hill-sides at lower elevations, mostly in the dry regions.

It is a large, spreading tree, growing to 20 meters or more in height and attaining a diameter of 1.5 meters. The young twigs are slender and finely hairy. The bark is dark gray or brown, and deeply cracked.

The alternate, compound leaves are evenly pinnate, 6 to 12 cm. long with 10 to 20 pairs of oblong, thin leaflets, 12 to 25 mm. long. The tree is never completely leafless except on very dry sites. The leaves are tender and are used as poultices for boils.

The small, yellow and red variegated flowers occur in mostly terminal, few-to several-flowered racemes which are shorter than the leaves. The petals are very unequal, the three upper ones large and nearly alike; the two lower ones minute and scale-like.

The fruit is a linear somewhat flattened pod, brown in color and from 5 to 15 cm. long. The outer shell is brittle when ripe and contains a dark brown fibrous acid pulp enclosing 3 to 10 brown, smooth compressed seeds. The seeds are used for diarrhea and the acid pulp is also used medicinally. The pulp is edible and can be made into candies or a refreshing drink. The seeds number about 400 to the pound.

The yellow wood is hard, heavy, fine grained, and durable and is employed for furniture, tool handles, turning, and general construction.

The species is commonly planted as an avenue tree, but the litter of the pods is objectionable. It is planted on forest fire-breaks in India because the ground under the shade of this tree usually remains bare.

PLATE - 7/8 natural size.



CAESALPINIACEAE

Cassia Fistula L.

Cañafístula, Golden shower,
Indian laburnum, Purging
Cassia.

This tree is a native of tropical Asia and is now widely spread throughout the tropics. It is found occasionally in Puerto Rico on hillsides and along the roads where it has escaped from cultivation and become naturalized.

It is a moderate-sized, deciduous tree with a rather open crown, growing to 20 meters in height and reaching a diameter of 7 dm. On young trees, the bark is smooth and light gray; on older trees it is reddish brown and exfoliates in hard scales.

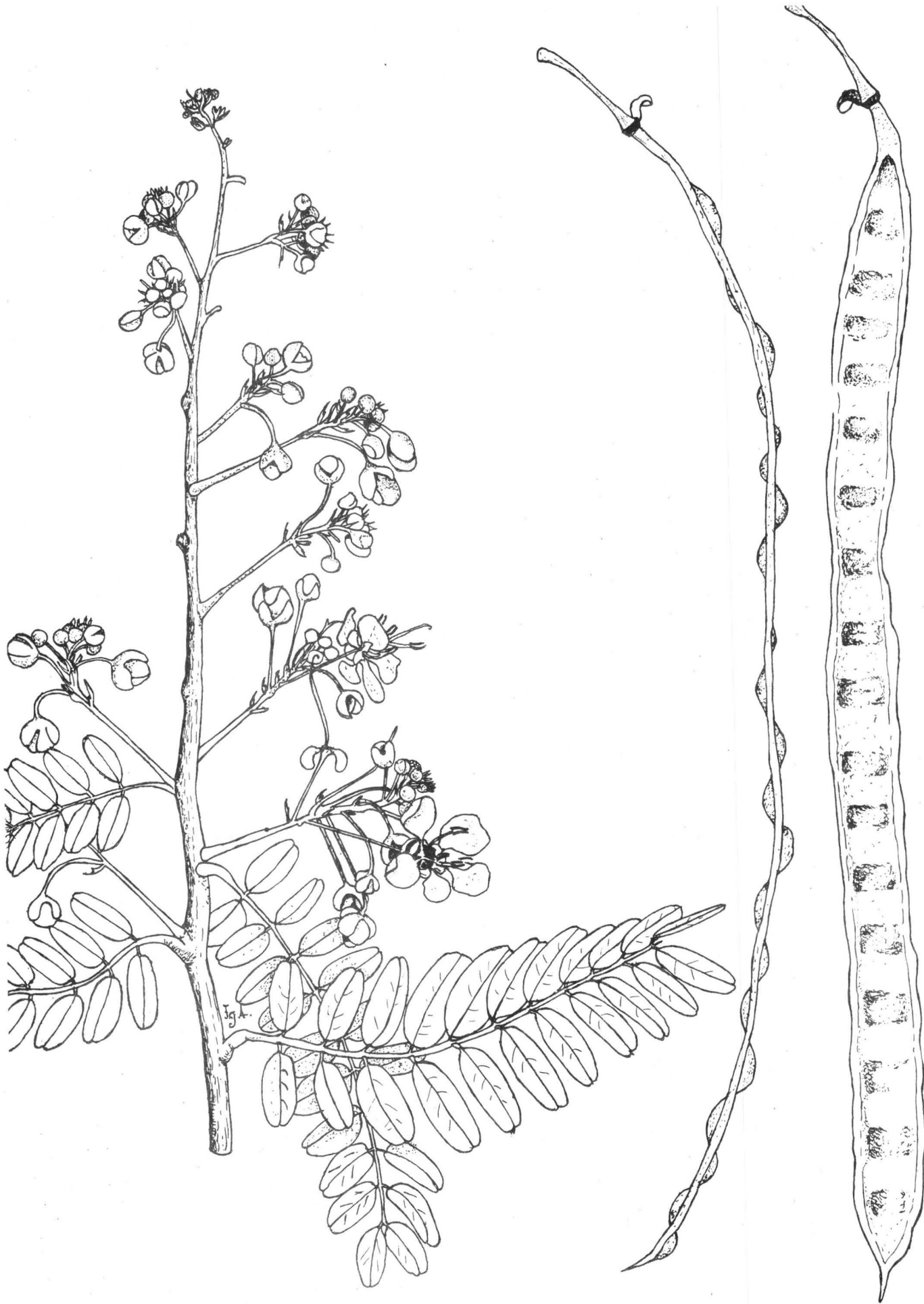
The large, pale green leaves are compound and range up to 5 dm. long. They are made up of 4 to 8 pairs of large leaflets, each 7 to 16 cm. long.

The beautiful golden-yellow flowers appear in drooping racemes when the tree is leafless or with the new leaves. They are 3 to 8 dm. long, and their beauty accounts for plantings along avenues and in gardens as an ornamental.

The fruit is very distinctive, being an almost straight, round pod up to 6 dm. long, and about 2 cm. thick. The smooth, hard, dark brown pods are indehiscent and divided by numerous transverse partitions into one-seeded cells, the seeds immersed in a dark brown sweetish pulp. This pulp is strongly purgative, and the pods are on sale in local markets for this purpose. The light brown, compressed seeds are hard, smooth and shiny, numbering about 2,500 to the pound. They are slow to germinate. Boiling them in water for 5 minutes stimulates them. Tests in India showed that the viability of the seeds lasted unimpaired for two years and that germination was better with one year old seed than with new.

The reddish wood is hard, strong, and durable and is used for house construction, carts, agricultural implements and posts. The bark is employed in tanning. The bark and leaves are also valued in India for external use in the treatment of skin diseases and especially for ringworm.

PLATE - 3/4 natural size.



CAESALPINIACEAE

Sciacassia siamea (Lam.) Britton.

Cassia siamea, Bombay blackwood.

This tree is native to southern Asia and was introduced into Puerto Rico in recent years. It is commonly planted in yards and along roads as a shade and ornamental tree.

It is a moderate-sized, evergreen tree. No specimens on the island have become large as yet.

The leaves are evenly pinnate with 6 to 10 pairs of glabrous, oblong leaflets from 4 to 6 cm. long. They are dark green in color with a slight purplish cast.

The yellow flowers appear in large terminal, pyramidal panicles and bloom for a long period. They are nearly regular, the five spreading petals being almost equal in size.

The narrow, flat, elongated pods are stiff and slightly curved; they hang on the tree in such numbers that they give it a somewhat untidy appearance. The reddish-brown pods dehisce at length to release numerous small seeds numbering about 16,000 to the pound.

The heartwood is small, dark brown and streaked, and is useful for small ornamental objects. The main use of the wood, however, is for fuel, trees on good sites being large enough for this purpose in a very few years.

The tree is easily propagated by seeds and grows rapidly. It grows well on a variety of sites in both the moist and dry sections of the island. In plantations, its growth is greatly handicapped by weed competition in contrast to its very rapid growth when clean cultivated in windbreaks. It has been planted to a considerable extent on the island for windbreaks but is not very satisfactory because it is easily broken and uprooted by the wind and because it is seriously attacked by scale insects.

PLATE - 7/8 natural size.



CAESALPINIACEAE

Peirania polyphylla (Jacq.) Britton & Rose. Retama, Retama prieta.

This species is found on hillsides and in thickets at lower and middle elevations, mostly in the dry southern and southwestern sections of the island. It also occurs in St. Thomas, St. Croix, Anegada, and Hispaniola.

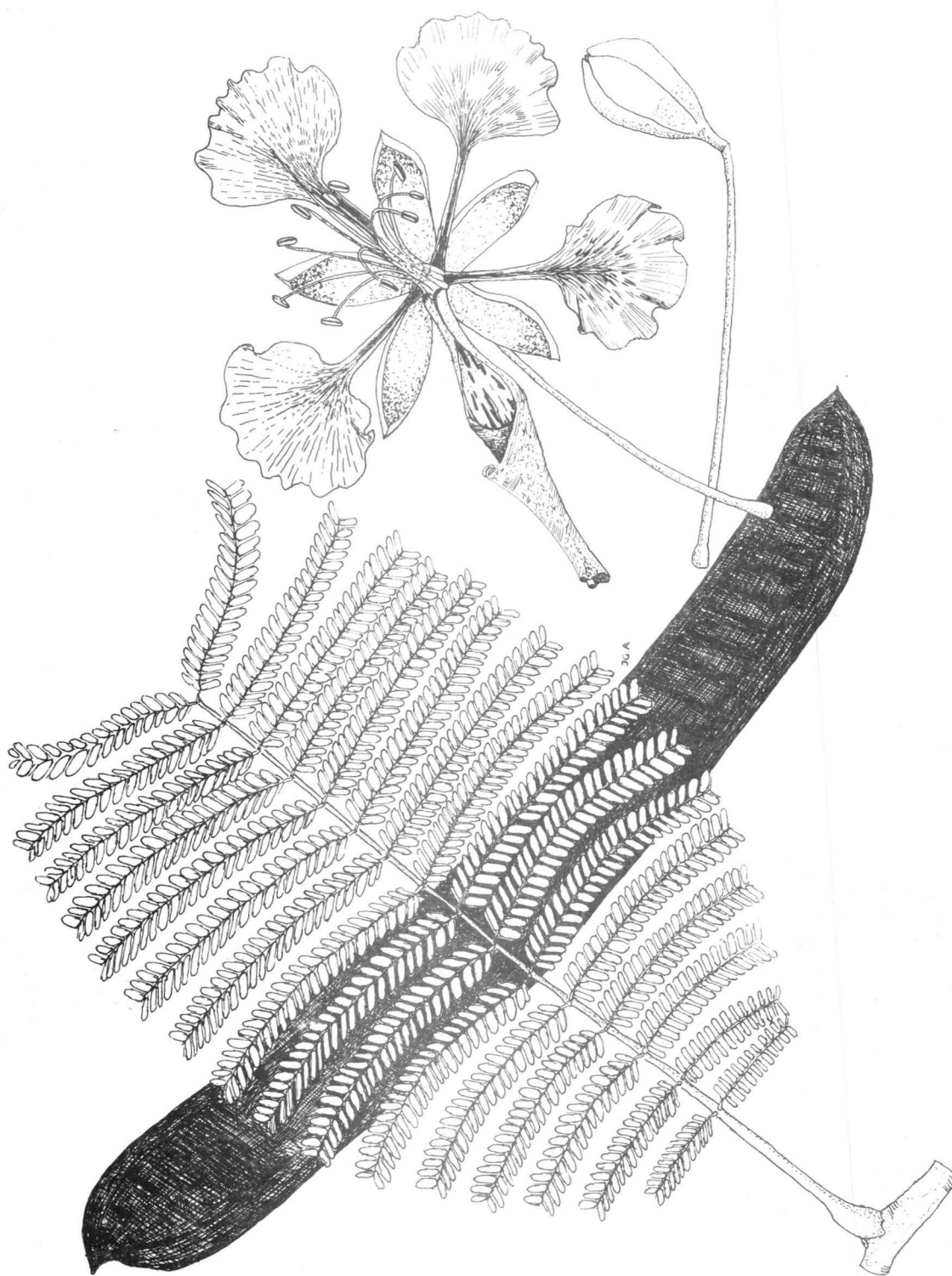
It is usually a shrub or a small tree, growing to 4 meters in height, but has been recorded as attaining 15 meters. The branches are slender, and the young twigs are sparingly covered with fine hairs.

The equally pinnate leaves, from 2 to 6 cm. long, are grouped at the nodes of the branches and consist of 5 to 15 pairs of very small leaflets.

The showy, bright yellow flowers are borne singly or in pairs and have 5 short-clawed petals about 1.5 cm. in length. The shrub or tree is a beautiful sight when in bloom and is sometimes planted for ornament, but will undoubtedly be used to a greater extent as it becomes better known.

The pods are linear, nearly straight, from 8 to 15 cm. long, and 6 to 8 mm. wide; drooping, shiny, and impressed between the seeds. They become black at maturity and split open to release the small, compressed seeds.

PLATE - natural size.



CAESALPINIACEAE

Delonix regia (Bojer) Raf.

Flamboyán, Flame tree,
Royal Poinciana.

The flamboyán is native to Madagascar but has been spread around the world in tropical and subtropical regions because of its showy bloom. In Puerto Rico it has been planted throughout the island and occasionally is found established spontaneously. It is such a well known tree that description of its characteristics seems hardly necessary.

It is a large, wide-spreading tree up to 10 or 20 meters high, with a trunk sometimes 1 meter in diameter, flanged at the base, and with smooth, thin, gray-brown bark.

The leaves are 3 to 5 dm. long, bipinnately compound with 10 to 25 pairs of pinnae, each of which bears 20 to 40 pairs of inequilateral leaflets 4 to 10 mm. long and rounded at both ends. The petioles are stout.

In early summer, the tree bursts forth into a mass of orange to scarlet flowers rendering this one of the most striking and conspicuous trees of the world. The five large petals are 5 to 7 cm. long, spreading, clawed and sometimes mottled.

The fruit is a large flat woody pod, 4 to 6 dm. long and 5 to 7 cm. wide with a single row of long, very hard seeds set transversely along its length. The dark brown or black pods render the tree rather unsightly during the winter when the leaves have been shed. They are used for fuel on the island.

The wood is whitish or yellowish, close-grained, soft, weak and finds little use except as firewood.

PLATE - Flower x $2/3$; leaf and pod x $3/8$



CAESALPINIACEAE

Haematoxylon campechianum L.

Campeche, Logwood.

The logwood is native to Central America, but has been introduced and naturalized in the West Indies, northern South America, and a few other tropical countries.

It is a small, gnarled tree, attaining a height of 15 meters, usually much less. It has a short trunk and spreading branches. The trunk is ridged with smooth or rough, grayish or brownish bark. The twigs are slender and armed with paired stipular spines, 5 to 15 mm. long.

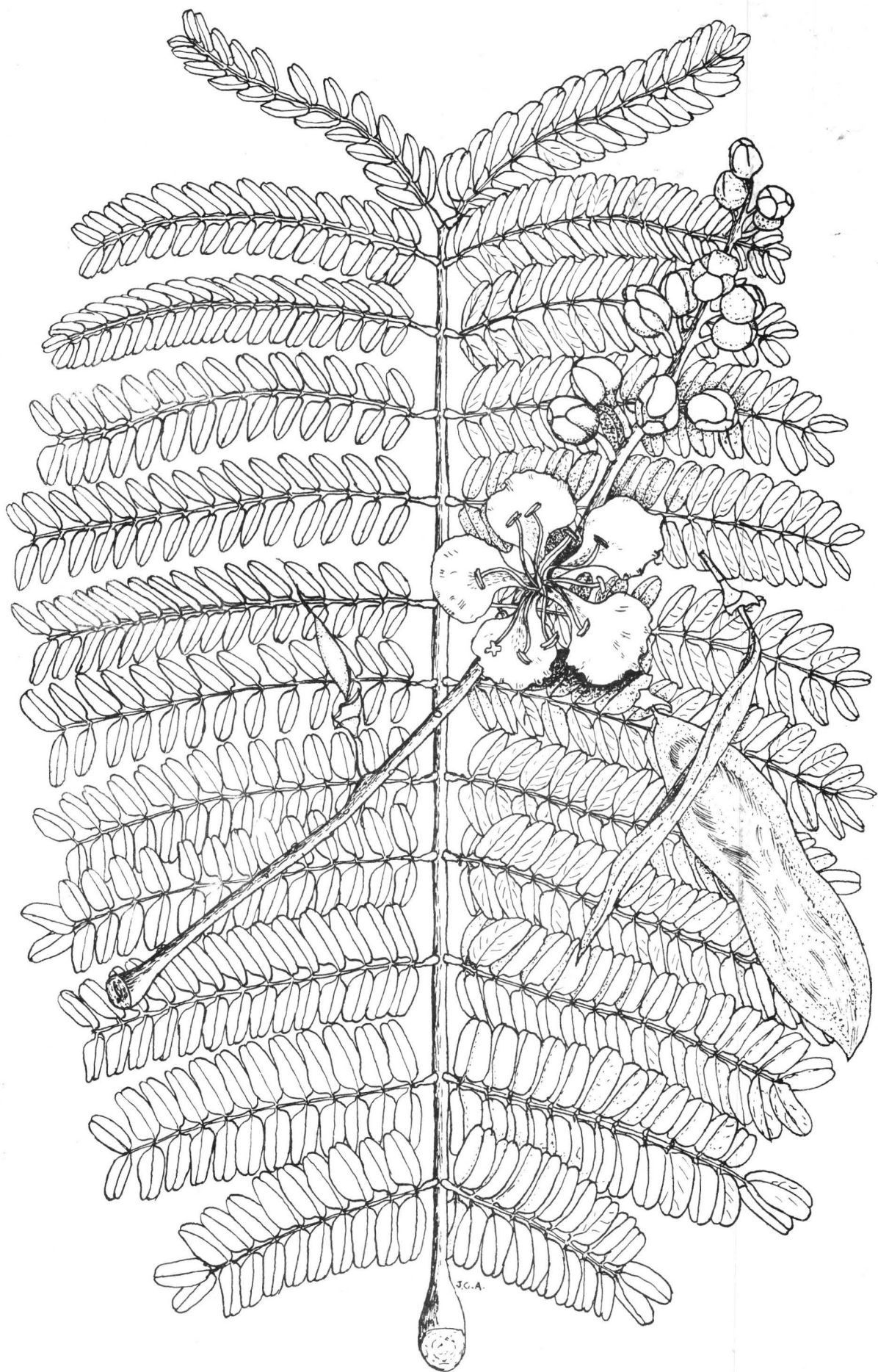
The even-pinnate leaves, 5 to 10 cm. long, consist of 2 to 4 pairs of obcordate, papery, finely many-veined leaflets, 1 to 3 cm. in length.

The pale yellow flowers, borne in abundance, make this a rather handsome tree when in bloom, and very attractive to honeybees. The flowers are fragrant, and occur in axillary racemes, about as long as the leaves. The five petals are spreading and somewhat unequal. The ten stamens are about twice as long as the petals.

The very thin, flat pods, 2 to 5 cm. long, are pointed at both ends and membranous. They open in a peculiar manner by splitting through the middle of the flat sides.

The hard, heavy heartwood is bright red in color, becoming darker on exposure, and when cut it gives off an odor of violets. The wood is highly durable, finishes smoothly, takes a high polish, and is used to a certain extent by wood-turners. Its principal use, however, is as a source of dyes, and large quantities are shipped to northern markets where the wood is reduced mechanically to small chips and the dye is extracted by boiling in water. The peculiar coloring principal, called haematoxylin, forms an orange-red solution with boiling water, turning yellow as it cools. Various shades and colors can be obtained by the use of various mordants, but the greater part is used in the production of different shades of black. It is also used to some extent in the manufacture of inks and for medicinal purposes.

PLATE = natural size.



CAESALPINIACEAE

Peltophorum ferrugineum (Dcne.) Benth.

Flamboyán amarillo,
Yellow Poinciana.

This tree is native to Ceylon, Malay, the Dutch East Indies, and northern Australia, but it has been spread widely throughout the tropics.

It is a large graceful tree with spreading branches, growing to 20 meters in height. Since it is a rather recent introduction to the island it has been planted only sparingly about houses and along the roads, but as people become more acquainted with the beauty of this species a rapid extension of its planting for ornament can be expected.

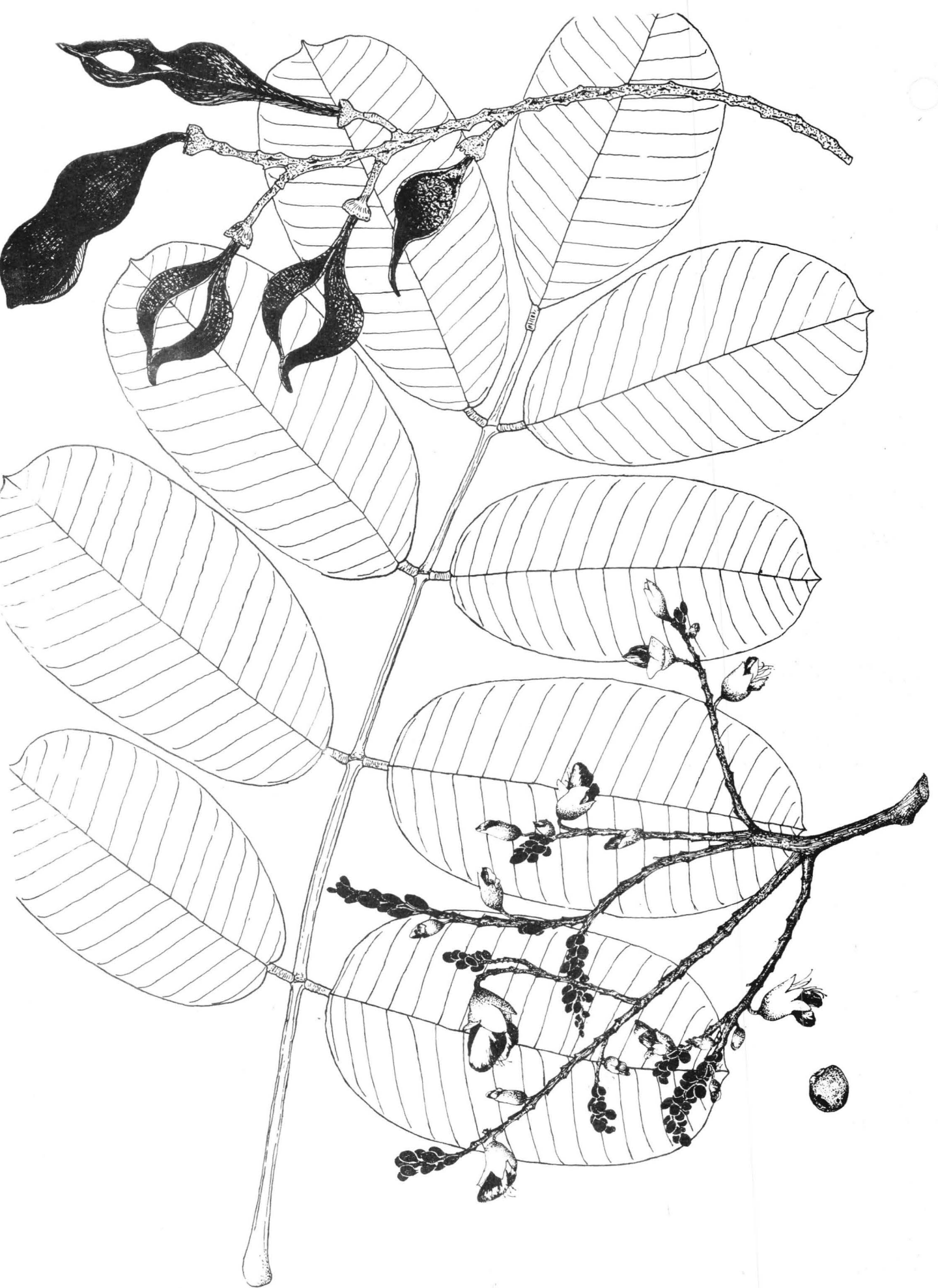
The feathery foliage consists of bipinnately compound leaves, 2 to 4 dm. in length, with ten to fifteen pairs of opposite pinnae, each with 10 to 15 pairs of oblong leaflets about 2 cm. in length.

The rusty yellow, sweet-scented flowers are borne in large, erect panicles, the branches of which are covered with fine, rusty-colored hairs.

The flat reddish pods, turning dark brown at maturity, are very conspicuous and rather attractive. The pods are from 6 to 10 cm. in length and contain from one to four flattened seeds.

The tree is propagated readily from seed and grows fairly rapidly. It is suited to dry as well as moist climates and does well up to about 2,000 feet above sea-level. It is ornamental in flower and in fruit and makes an excellent avenue or shade tree.

PLATE - 7/8 natural size.



FABACEAE

Ormosia Krugii Urban

Palo de matos, Peronía.

This tree is restricted to Puerto Rico and Dominica. In Puerto Rico it is found at middle and higher elevations throughout the mountains.

It is a large tree, growing to 25 meters high and 1 meter in diameter. The twigs, as well as the foliage and inflorescence, are covered with fine brownish hairs. The bark is smooth and light brown in color.

The large, odd-pinnate leaves with 5 to 9 leaflets and a stout rachis range from 3 to 10 dm. in length. The leaflets are oval or elliptic in shape, bluntly acuminate at the apex, leathery, and very distinctive because of their light green color and the prominent, widely spaced lateral venation.

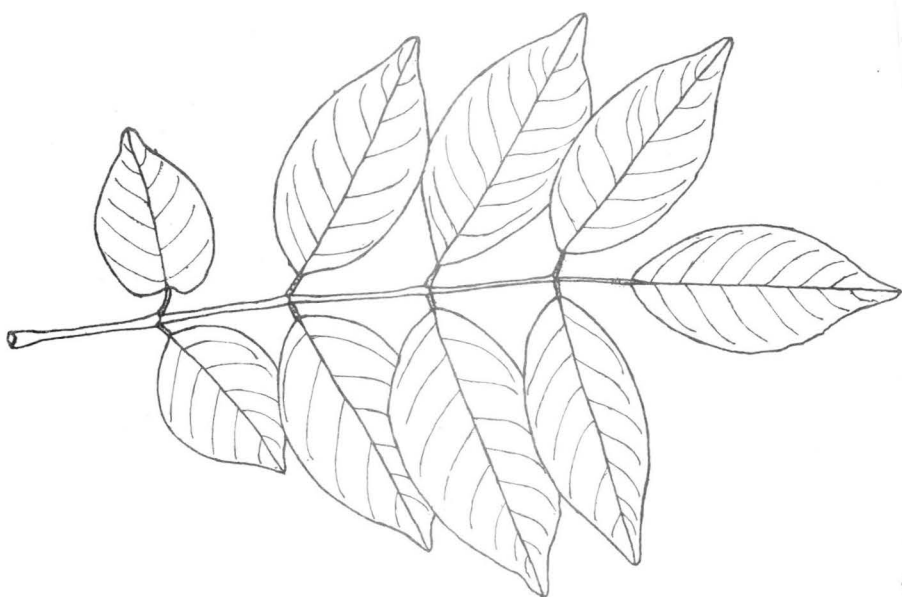
The dark violet pea-like flowers occur in large terminal or axillary many-flowered panicles. The petals are about 15 mm. long.

The fruit is a one to several-seeded pod, 5 to 10 cm. long, and about 2 cm. across the seeds. It is deeply constricted between them and pointed at both ends. The seeds are suborbicular, about 1 cm. broad, and of a clear red color or sometimes with a black spot.

The wood is light, soft and weak and finds little use except as firewood.

The tree is apparently shallow-rooted and not windfirm as a great many living specimens are found in a prostrate or leaning position.

PLATE - 7/8 natural size.



FABACEAE

Gliricidia sepium (Jacq.) Steud.

Madre de cacao, Mata ratón.

The Madre de cacao is native to Central America and northern South America but is widely distributed in the West Indies and other tropical regions. It has been planted fairly commonly in Puerto Rico at lower and middle elevations and appears to have become naturalized in certain districts.

It is a small to medium-sized, spreading tree, growing to 10 meters in height. The young twigs are silky hairy and the bark on the trunk is grayish to brownish in color.

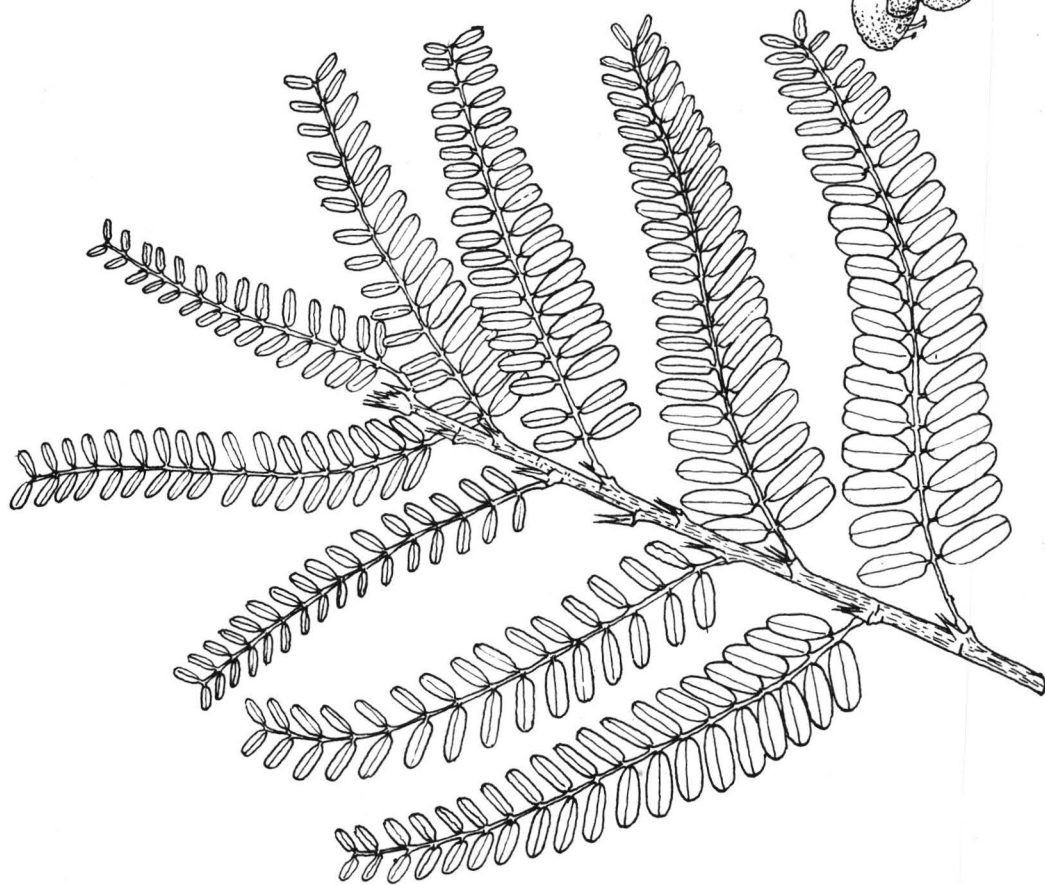
The odd-pinnate leaves, up to 4 dm. long, consist of 7 to 17 ovate to ovate-lanceolate leaflets, each 3 to 7 cm. long. These, as well as the seeds, are used to poison rats, mice and other rodents and are said to be poisonous to horses. However, the leaves are highly nutritious for cattle. When dried the leaves smell like new-mown hay. In Panama, they are applied as poultices to relieve bruises, sores, erysipelas, and similar affections.

The pink flowers, borne in numerous, showy racemes usually at times when the tree is leafless, are very ornamental. They are pea-like and cover the long branches. In Salvador, as well as elsewhere, these are fried and eaten, being of good flavor when so prepared.

The wood is reddish purple, hard, heavy, strong, fine-grained and very durable in the soil. It should have use in the manufacture of furniture.

The tree is easily propagated from seed or cuttings, and for this reason it is commonly employed for live fence-posts. It is used as a shade tree for cacao both because its roots are toxic to the rodents which feed on those of cacao, and because of the beneficial effect on the growth of the cacao resulting from the nitrogen-fixing bacteria upon its roots. The tree also makes a good support for vanilla.

PLATE - 3/4 natural size.



FABACEAE

Sabinea florida (Vahl) DC.

Retama, Wattapama.

Retama is native only to Puerto Rico and the Virgin Islands. It occurs at lower and middle elevations in moist districts on the island and is occasionally planted for ornament, being very attractive when in bloom.

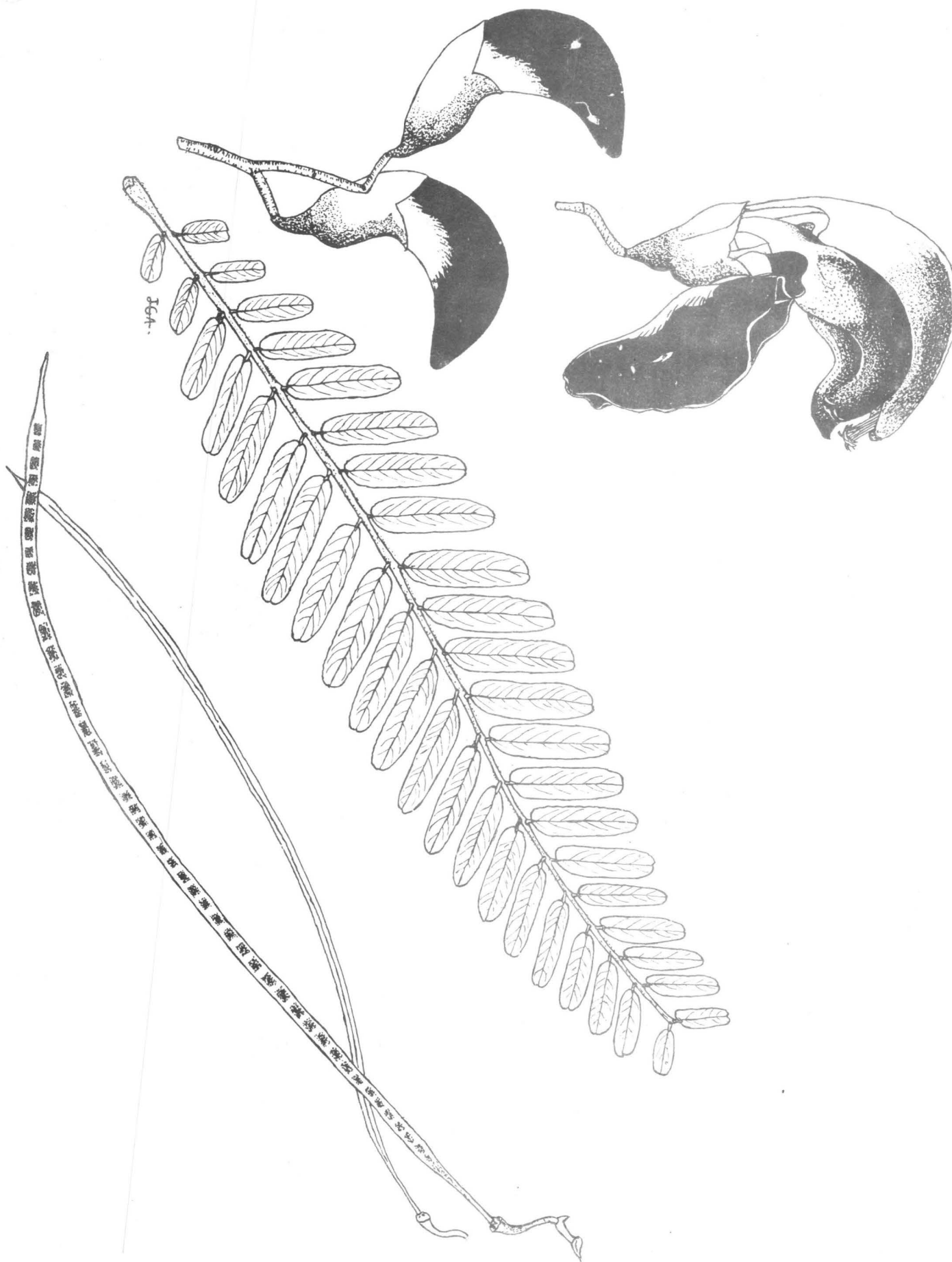
It is a deciduous shrub or small tree growing to 6 meters in height. It has light-colored bark and long wand-like branches.

The alternate, compound leaves are equally pinnate, consisting of 5 to 24 pairs of oblong or elliptic leaflets, 8 to 15 mm. in length. The leaves range in length from 4 to 11 cm. and have a pair of pointed stipules about 5 mm. long at the base of the short petioles.

The pea-like flowers, typical of the family, are crowded along the branches in clusters at the nodes, appearing usually during the period in the spring when the tree is leafless. They are lavender to pale purple in color and although they persist for only a short time, the abundance of color produced warrants a greater use of this species as an ornamental on the island.

The fruit is a thin, slender-stemmed pod from 7 to 10 cm. long and from 4 to 10 mm. wide.

PLATE - 7/8 natural size.



FABACEAE

Agati grandiflora (L.) Desv.

Gallito, Báculo, Cresta de gallo, Sesbán

This tree is native to tropical Asia, but it has been introduced into many tropical countries as an ornamental. In Puerto Rico it has escaped from cultivation and become naturalized.

It is a small erect tree, growing to 12 meters in height. It has few branches and rough bark.

The long, narrow leaves are pinnate, 2 to 3.5 dm. long, with 10 to 30 pairs of pale green leaflets which are oblong, entire, nearly rounded at the apex, and inequilaterally narrowed at the base, and 2 to 4 cm. long.

The large, showy flowers are borne in two to five-flowered, pendent, axillary racemes. The white-flowered variety is the most common on the island, but one occasionally finds the red-flowered variety, which is shown in the sketch. The petals are 6 to 10 cm. long, their arrangement and shape giving rise to the Spanish name "cresta de gallo". The large, fleshy petals as well as the tender leaves are relished in curries and soups, or fried with butter.

The pods are very long and slender, from 2 to 4 dm. long and less than 1 cm. wide, beaked at the apex and narrowed at the base into a long, stout stipe. The seeds are separated within the pods by transverse partitions.

The nearly white wood is soft and light and has no special use, but in India the tree has many uses besides its value for ornamentation. The bark, of which the inner portion yields a good fiber, is astringent and has been employed in infusions in the first stages of smallpox and other eruptive fevers.

The juice of the leaves and flowers forms a popular remedy for headache and nasal catarrh. It is blown into the nostrils and produces a copious discharge which relieves the painful pressure. The same juice is also squeezed into the eyes to cure dimness of vision.

PLATE - leaf and flowers x 7/8; pods x 7/16

GLOSSARY

- Acuminate. Drawn out at the apex into a long slender point.
- Alternate. Not opposite each other on the axis, but arranged singly at different heights.
- Apex. The top; as the end of the leaf opposite the petiole.
- Areolate. Divided into angular spaces; reticulate.
- Armed. Bearing spines, prickles, or thorns.
- Axil. The angle formed by a leaf or branch with the stem.
- Axillary. In or from an axil.
- Bole. Trunk of a tree.
- Bract. The more or less modified leaf of a flower-cluster.
- Buttress. An aerial outgrowth derived from root and stem which joins the lateral roots to the trunk and acts as a support for the latter.
- Capsule. A dry dehiscent fruit (pod).
- Coriaceous. Of the texture of leather.
- Cyme. A flower-cluster in which the flower opens from the center outward.
- Deciduous. Falling off, not persistent.
- Dehiscent. Splitting open by valves or slits; said of capsules and anthers.
- Drupe. A stone fruit.
- Entire. Without marginal serrations or teeth.
- Follicle. A fruit formed from a single carpel an usually dehiscent along the ventral suture.
- Glabrous. Smooth, not pubescent or hairy.
- Heartwood. The inner dead wood or duramen of a tree trunk.
- Imbricate. Overlapping like the tiles of a roof.
- Indehiscent. Not splitting open; remaining closed.
- Lanceolate. Lance-shaped; broadest over the middle and tapering to both ends.
- Latex. Milky sap.
- Lenticel. Lenticular corky growths on young bark.
- Midrib. Central or main vein of a leaf.
- Node. The portion of the stem which bears a leaf or whorl of leaves.
- Obcordate. Inversely heart-shaped.
- Obovate. Ovate with the broader end toward the apex.
- Ocrea. A cup-shaped structure around a stem, formed from united stipules.
- Orbicular. A flat body circular in outline.
- Ovate. Egg-shaped.
- Palmate. Shaped like a palm-leaf.
- Panicle. A loose, compound flower-cluster.
- Peduncle. The stalk of an inflorescence.
- Pellucid. Clear, transparent.
- Petiole. Foot-stalk of a leaf.
- Pinnae. The primary divisions of a bipinnate leaf.
- Pinnate. A leaf with leaflets arranged along each side of a common petiole.
- Pistillate. Said of a unisexual flower without fertile stamens.
- Pod. A dehiscent fruit.
- Pubescent. Clothed with soft, short hairs.
- Pyriform. Pear-shaped.

Raceme. An indeterminate inflorescence composed of a primary axis bearing pedicelled flowers.

Rachis. The axis of an inflorescence or of a compound leaf.

Reticulate. Netted; with the form of a network.

Sessile. Without a stalk.

Spike. An elongate floriferous axis bearing sessile flowers.

Stilt-roots. Roots developed from the stem of certain trees, reaching to the ground and then developing normal roots.

Stipular. Having the form of a stipule.

Stipule. A leaf-like appendage of the base of the petiole of leaves.

Tannin. Astringent substances that occur in the bark of trees and are used in the tanning industry.

Tomentose. Clothed with a cottony or wooly pubescence.

Terete. Cylindrical; circular in transverse section.

Umbel. An inflorescence with numerous pedicels springing from the same point like the rays of an umbrella.

Variagated. Leaves which are partly pale in color.

Vein. The nerves or fibrovascular bundles of a leaf.

Whorl. A ring or circle of organs inserted around an axis—as the organs of a flower or leaves on a stem; verticel.

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